STEEL

The

Metalworking Weekly

JULY 4, 1960

A PENTON PUBLICATION

Numerical Control Bids for Spotlight At Machine Tool Exposition—1960

Ceramic Industry Widens Its Niche

Approach Automation Step by Step

Component Buyers Keep Brakes On

CONTENTS—TURN PAGE

MATERIALS EFFICIENCY

How to Get It

Better purchase and use of materials pose major challenges for greater efficiency, says T. O. English, general purchasing agent for Aluminum Co. of America. Reason: Materials represent about half the costs in most companies. For tips on what can be done about meeting the challenges. Page 45

65-inch EC&M magnet on this open hearth stockyard crane carries scrap from gondola cars at left to the charging buckets in center and at right. Both magnet and crane are equipped with EC&M control.

EC&M ALL-WELDED Magnets Give EXTRA Lifting Power

and Extra Lifting Power means Lower Handling Costs

• You get extra lift with EC&M all-welded construction. Because the pole shoes are welded in place, they fit more snugly—and they stay that way. Recesses for bolts are eliminated. The result—a more efficient magnetic path, with the entire face of the magnet effective for lifting.

EC&M welded magnets give you other advantages, too. The continuous weld makes them completely waterproof. They have greater impact-resistance, are better able to take the hard knocks of mill operation. If outer leads should be damaged, solderless connectors under protective covers simplify replacement.

EC&M lifting magnets are available in diameters from 39 to 80 inches. Magnets with bolted construction are also available when desired, as well as light-weight magnets for fast-moving mobile cranes. For any magnet, it makes sense to specify an EC&M controller.

Write for details! Bulletin 1300 gives information on the complete line of EC&M magnets and controllers

Close-up view shows EC&M magnet loading scrap into the charging buckets. The special low-carbon steel housing has high permeability, contributes to extra magnet efficiency.

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

4928

This Week in STEEL
The Metalworking Weekly

July 4, 1960 Vol. 147 No. 1

Numerical Control Bids for Machine Tool Spotlight

Look for the new control systems to steal the show at The Machine Tool Exposition—1960 in Chicago in September. More than 100 models of tape controlled machines will be exhibited. See STEEL's preview PAGE 35

Steel Coils Alloyed in Gas

Lee Wilson, chairman of Cleveland's Lee Wilson Engineering Co. Inc., says his gas alloying process will produce new steels for home appliances and electric motors and equipment. Major steel companies around the world agree. They have ordered $27 million worth of special "open coil" annealing and alloying equipment. Steels suitable for direct-on, one coat porcelain enameling can be produced at a saving of $10 to $12 per ton; comparable savings are expected for nonaging, deep-drawing types produced from rimmed steel instead of aluminum killed metal. All major U. S. producers are adopting the process. PAGE 37

Ceramic Industry Widens Its Niche

You'll be hearing more and more about the new ceramics which are ready to challenge established materials in the metalworking markets. Dramatic advances are on the horizon for materials that withstand high temperatures and other extreme environmental conditions. Ceramic cutting tools, for example, are at the stage carbides were 25 years ago, reports the American Society of Tool & Manufacturing Engineers. One promising application: Machining cast iron parts. PAGE 38

Approach Automation Step by Step

That's the advice of Robert E. Blackwell, steel industry sales manager, Hagan Chemicals & Controls Inc., Pittsburgh. Control, data handling, and computing equipment is available for a gradual, co-ordinated changeover to automatic operation. Here is an analysis of the best way to proceed intelligently toward total automation of a process or plant, without wasting expensive equipment capacity. PAGE 68

Component Buyers Keep Brakes On

Buyers are continuing to throttle down inventory levels, a move that started three months ago. Closer inventory control, reported by STEEL earlier this year, is playing a major part in the stock leveling. Only 7 per cent of the respondents to STEEL's quarterly survey of component buyers foresee an inventory buildup this quarter. PAGE 95

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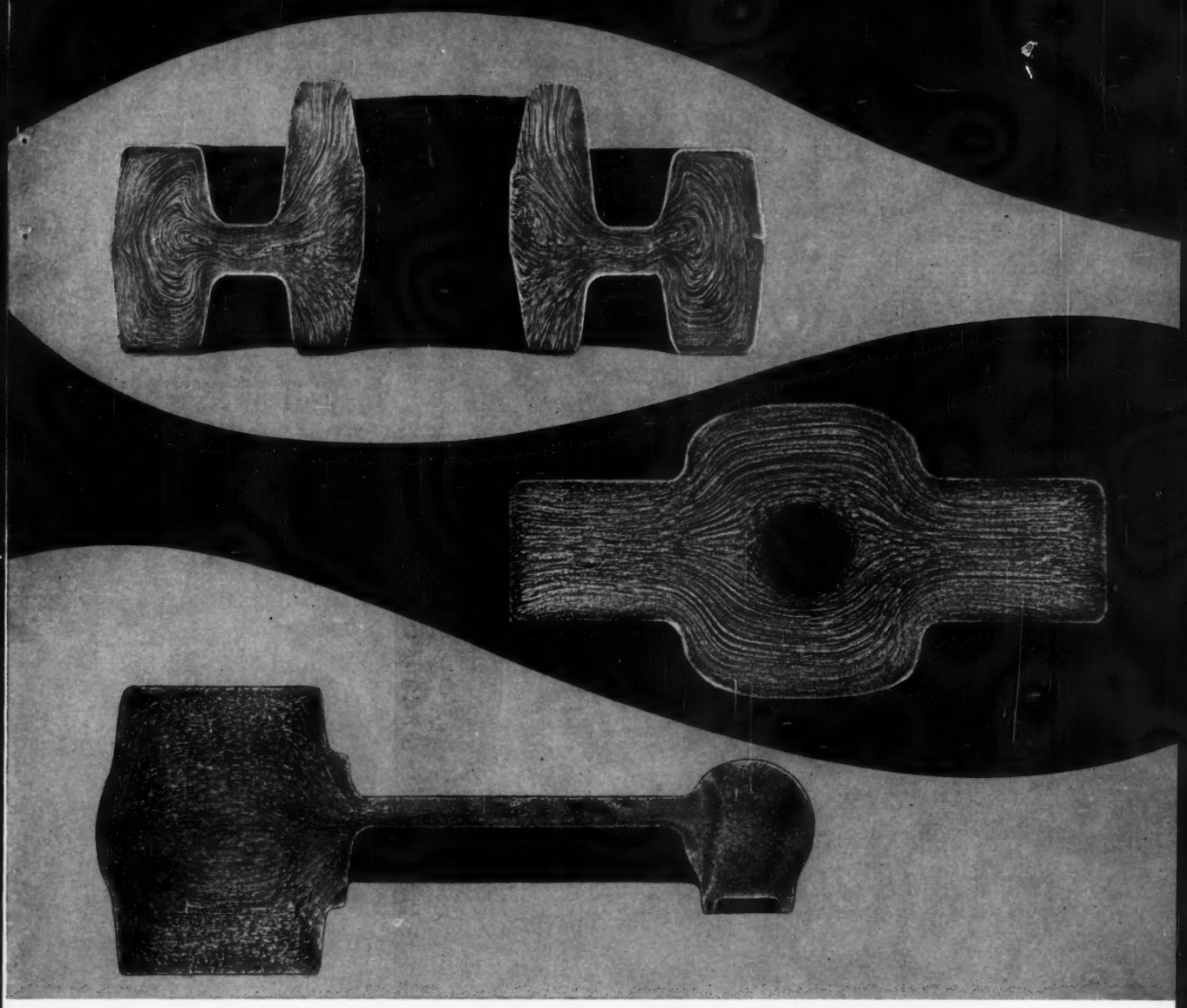

Only forgings have flow lines like these

When quality steel forgings are cut in half, polished, etched, and dyed, you can see one reason for their great strength. The grain structure shows how the forging process has "worked" added strength into the steel. Note how the grain follows the contour of the forgings, placing the greatest strength—*across* the direction of flow –where it is most needed.

Forged steel is sound steel

Forged steel has strength without undue bulk. It's economical because it saves many costly machining and fabricating operations. Forging improves the steel's mechanical properties, adds to its service life.

High-grade forgings can be made only from top-quality steel

Bethlehem produces special-quality carbon and alloy steel for forgings: bars, billets, blooms. Just call our nearest sales office for your steel requirements.

Bethlehem Steel Company, Bethlehem, Pa.
Export Distributor: Bethlehem Steel Export Corporation

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for Strength
... Economy
... Versatility

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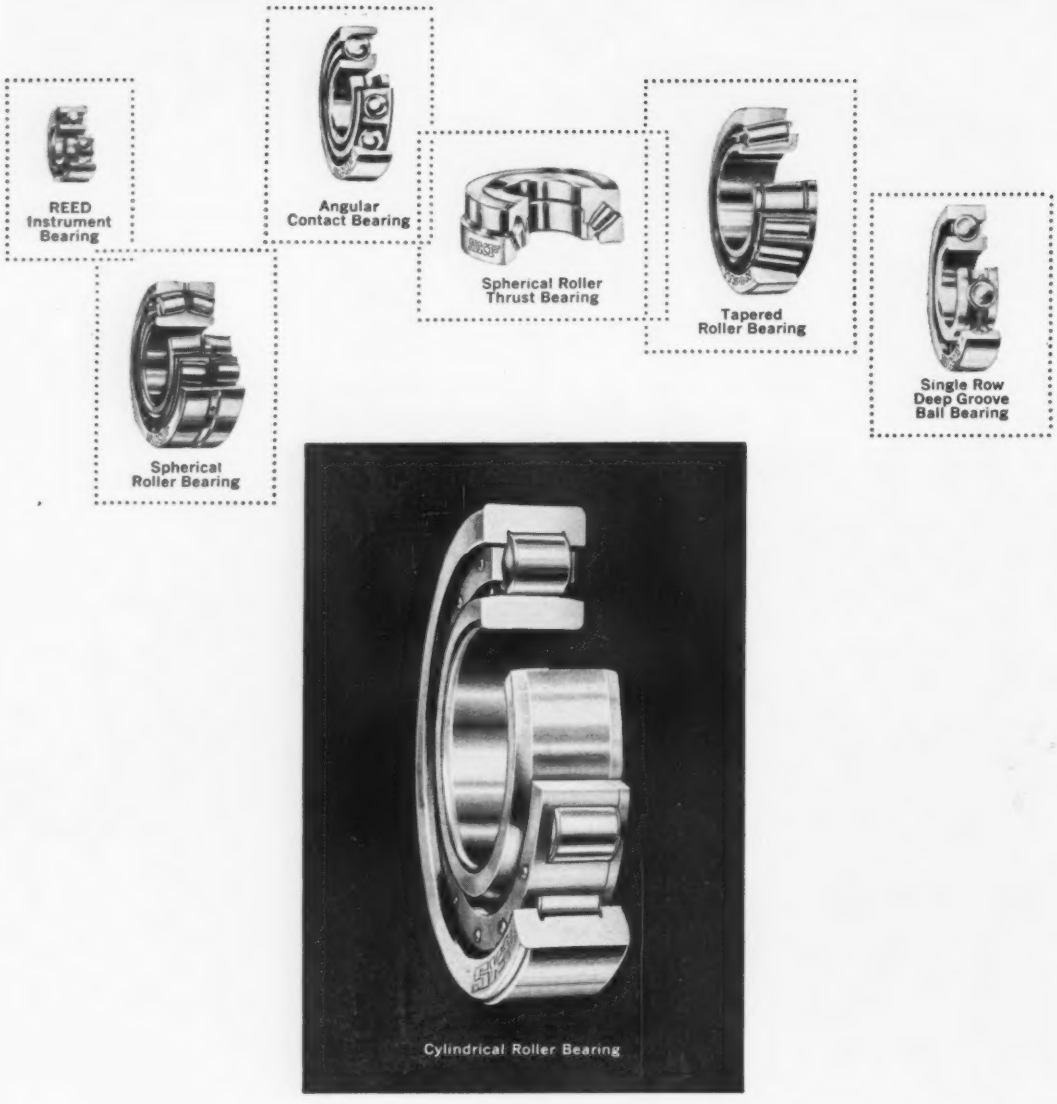
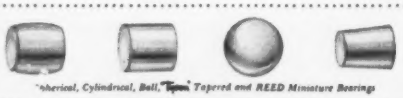


What's a "special size" in production bearings?

SKF makes so many standard sizes, there's practically no such thing as a "special size" of bearing. They range from tiny instrument bearings right up to four-row tapered roller bearings—and account for almost every possible bore size in-between.

Take SKF's standard cylindrical roller bearing, for example. It's promptly available in 154 sizes of single- and double-row types —for shaft diameters ranging from 1" to 9.5". Every size, in both types, offers high radial capacity in relation to its size and operates at highest speeds because of its very low friction.

So, before you specify a "special size" bearing, call the nearest SKF sales office first. The odds are better than 1,000 to 1 that there's already a standard SKF bearing of exactly the size you need. 6007



Spherical, Cylindrical, Ball, Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE

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SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

Heat-treating problem?
Profit from the experience of these users

Each of these users had a heat-treating problem. Their problems were different, yet they all took the same first step toward a successful solution. They consulted a Hevi-Duty Sales Engineer . . . wisely.

A Hevi-Duty Sales Engineer is a specialist. He is qualified to recommend equipment for an entire heat processing system — does it nearly every day. And when it comes to specifying equipment, he has no ax to grind. He doesn't have to push any special size or type. Hevi-Duty makes them all — electric or fuel-fired, all sizes, all temperatures. And if none of these fit exactly, Hevi-Duty will quickly adapt or design a unit that will.

If you have a heat-treating problem, be sure to call in a Hevi-Duty Sales Engineer. He'll be glad to come in without obligation and you will probably profit from his recommendations.

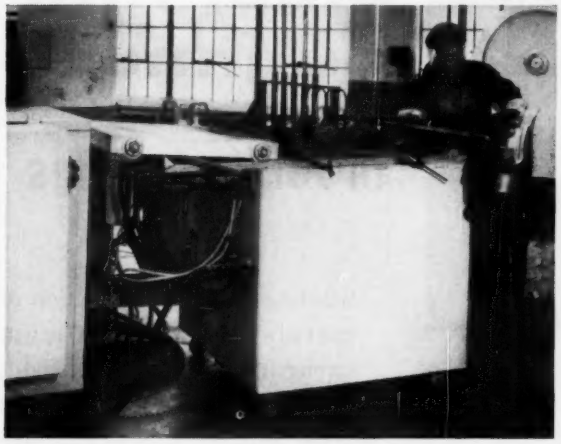
HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

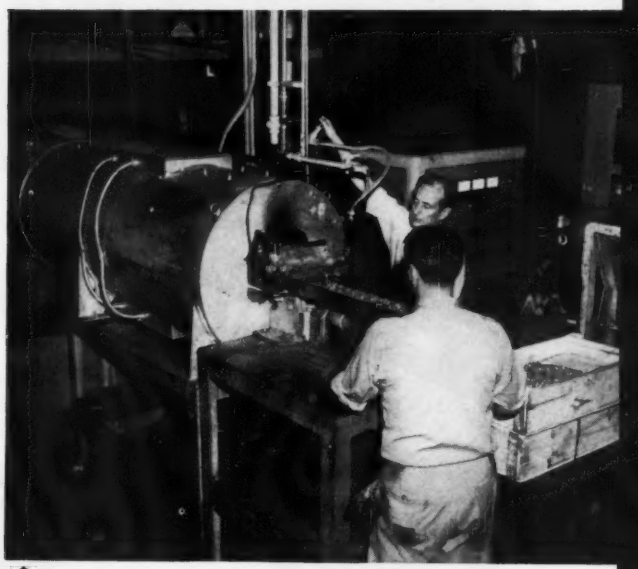
B P C

A Division of Basic Products Corporation

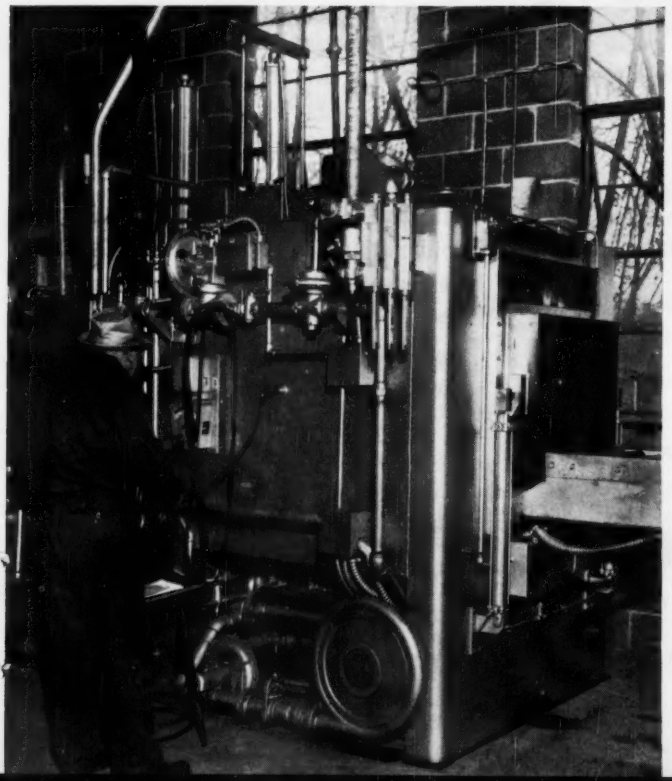
Hevi-Duty Electric Company, Milwaukee 1, Wis.



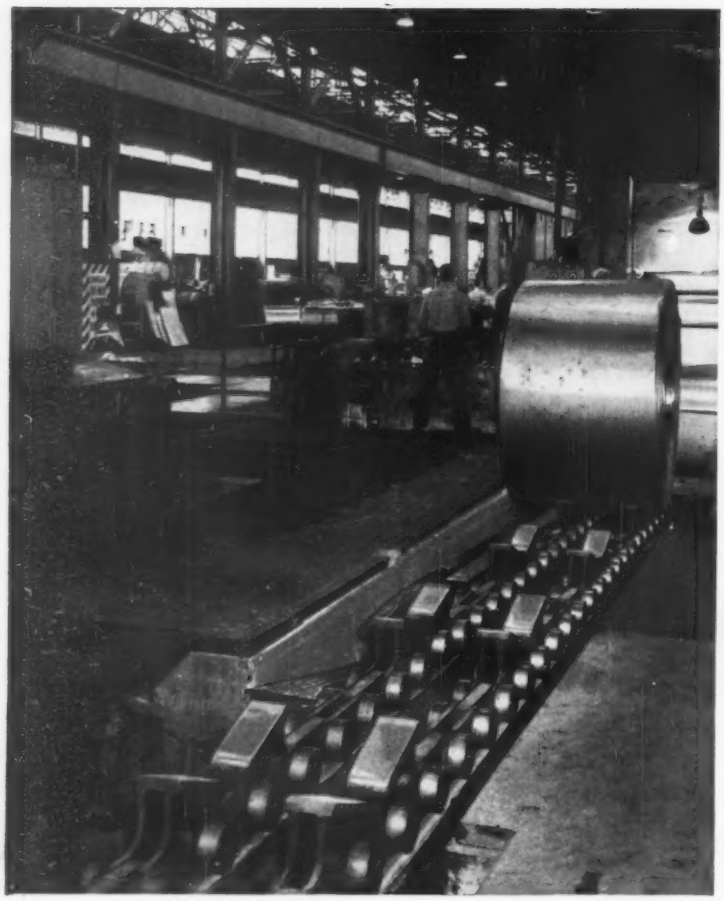
This immersed electrode salt bath furnace is used at Clevite Research Center, Cleveland. It has a steel pot for low temperatures and a ceramic pot for temperatures up to 2300°F. The furnace is mounted on casters and coupled with a transformer so that it may be used for experimental work anywhere in the shop. ***Please write for Bulletin 655.***

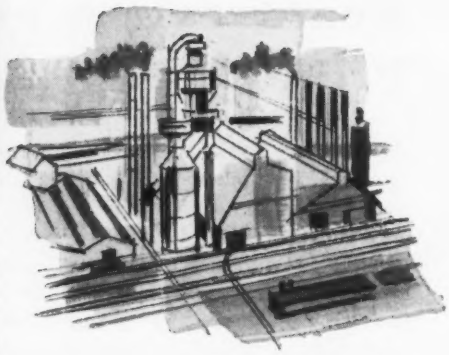


This Hevi-Duty Shaker Hearth Furnace proved to be the profitable answer for Fred Heinzelman & Sons, a New York City commercial heat treater. Small parts are fed onto the hearth and progress through heat and quench cycles automatically. Switching to a shaker eliminated jig and wire time and increased production from 20 to 60 pounds an hour. In addition, the uniform quality of the work has eliminated rejects. ***Please write for Bulletin 1057.***



Ken Ireland, Ireland Heat Treating Company, Orange, Conn., reports a 50 percent reduction in operating costs since switching to this Hevi-Duty Gas-Fired Clean-Line Automatic Heat Treat Unit. One of its jobs is hardening 410 stainless steel knife blades. Knives come out straighter and brighter, with a more consistent hardness than previously achieved. ***For information request Bulletin D-100.***





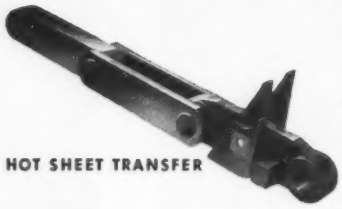
get steel mill toughness

in Jeffrey chains

Starting right with selection of metals to give maximum strength with minimum weight, Jeffrey builds durability into steel mill chains. They are designed for continuous operation. Machining, heat treatment, assembly and inspection are rigidly controlled to Jeffrey's high standards.

You can select Jeffrey chain and attachments for every steel mill requirement or have them tailor-made to fit the job. The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

FOR CROP CONVEYORS



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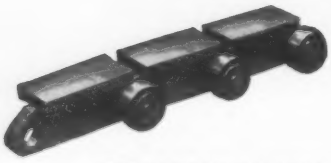
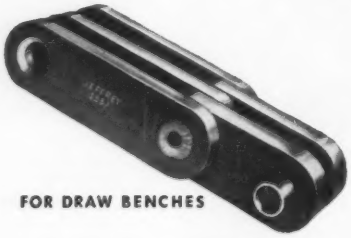
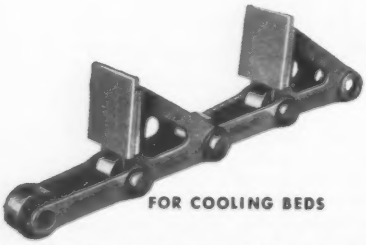


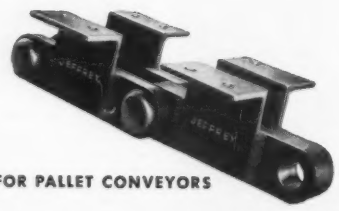
FOR HOT COIL CONVEYORS



FOR DRAW BENCHES



FOR COOLING BEDS



FOR PALLET CONVEYORS

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

Sixth Usership Contest Opens

Here Are Three $500 Prize Winners . . .

(l to r) Ernest J. Hills, senior engineer, Radio Corp. of America, Lancaster, Pa.; Loren W. Smith, assistant vice president, Symington-Gould Co., Depew, N. Y.; Francis X. Terrio, purchasing agent, Porter-Cable Machine Co., Syracuse, N. Y. They collected awards in the February, March, and April usership contests. You too might win. Just read the rules that start to the left of here.

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—July, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

You can enter as many times as you wish. Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Sept. 1.**

A Smiling Loser

Miss June Schilens of our Reprint Department lost a bet she made with herself. On May 2, the editors published Editor Walt Campbell's testimony "The Impact of Foreign Competition," which he gave before the House Appropriations Subcommittee on Foreign Operations. At that time, June said: "This one will hit 20,000 reprints." It has generated calls for 29,628 copies, and the tide shows no sign of ebbing.

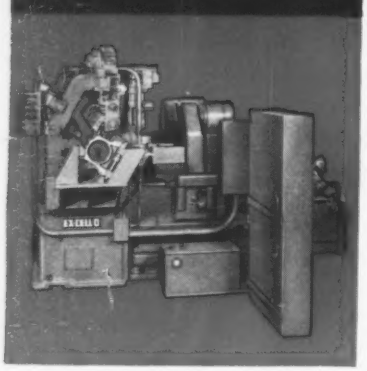
She has had phone calls, telegrams, letters, night letters, and personal visits from people asking how they can get reprints. One request came from a fellow who had heard only snatches of Walt's testimony when it was broadcast over the Manion Forum radio network. He had been driving across Oklahoma when a thunderstorm interfered with reception on his car's radio. He got his copy.

The testimony has been carried by news wire services, featured by newspapers and columnists, reproduced in direct mail pieces, posted on company bulletin boards, printed in company publications, appeared in the June 9 *Congressional Record*, and has been used in speeches given by business executives. We'll give you another reprint count when things slow down a little.

A Report Maker Reports

"I wish to commend you on the usefulness of your surveys of metalworking's capital equipment spending plans," says Kenneth C. Sprain, supervisor—Report Analysis, A. O. Smith Corp., Milwaukee. "Reliable indicators of capital spending

Step-by-Step Automation with Ex-Cell-O Specials



Your first step into automation may cost much less than you think. In medium-sized shops, for example, a profitable, automated set-up may involve the purchase of a relatively simple transfer machine, such as the one illustrated above, consisting of two standard way-type units. Or, even more simply, a single standard machine which easily fits into automated set-ups later on.

In any case, a host of Ex-Cell-O engineers, laboratory technicians and production specialists are at your service. *No obligation whatsoever.* Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit.

SEND FOR FREE BROCHURE

This 20-page catalog will show you the most profitable way to put automation into your present operations—make your own "Automation Appraisal." Ask for Bulletin 50155.

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57-88

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

trends in this area are most useful, particularly to producers of metalworking equipment . . .

"Incidentally, I have found each of your Program for Management articles highly interesting and am sure many management people, and companies, will benefit from these well written and well documented articles."

Mr. Sprain, you'll want to read the first installment of our Materials Efficiency series. It starts in this issue. You'll find 12 more articles appearing on alternate weeks throughout the remainder of this year.

Now to Capital Equipment

Next week, you'll learn about metalworking's capital equipment spending plans for the second half of 1960. Associate Editor George Howick is putting the finishing touches on the report, with an assist from our data processing people. He surveyed companies that purchase one-third of all equipment bought by U. S. metalworking, asking for dollar value of orders they will place. The equipment categories: Machine tools, material handling, presses, heat treating, surface cleaning and finishing, joining and assembly, testing and inspection, steelmaking, foundry, and office.

The report will show percentage changes in equipment orders by industries. It will also give an indication of metalworking's preliminary purchasing plans for the first half of 1961.

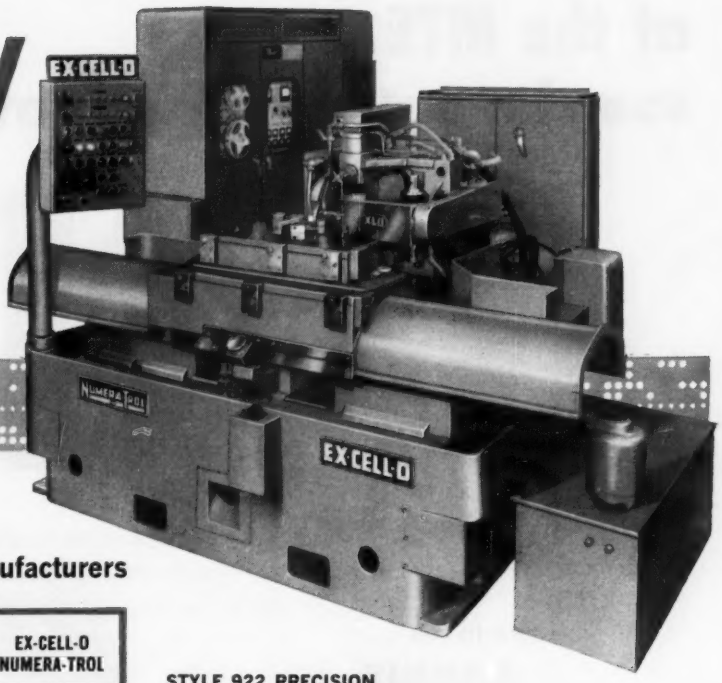
In a special survey, George also found out what's going to happen to machine tool orders during the third and fourth quarters of 1960. The Machine Tool Exposition — 1960 (Chicago, Sept. 6-16) may cause some companies to wait until they see new equipment on display before ordering.

We Have a Short Note . . .

. . . from Alvin V. Gruber, sales manager, Condenser Service & Engineering Co. Inc., Hoboken, N. J., who asks: "Who won first half Beat-the-Experts contest?"

Mr. Gruber, the results of our contest, in which readers estimated U. S. passenger car production for the first six months of 1960, will be announced later this month. Detroit Editor Don Postma is obtaining production figures right about now from *Ward's Automotive Reports.*

a study in time



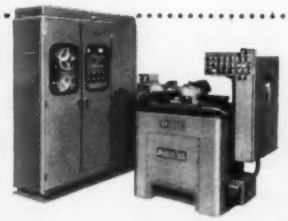
How Ex-Cell-O Numera-Trol Cuts Costs for Three Modern Manufacturers

Part: TEMPLETS	CONVENTIONAL METHODS	EX-CELL-O NUMERA-TROL
Lead time	128 hrs.	16 hrs.
Grinding per/piece	60 hrs.	6 hrs.
TIME SAVED	166 HOURS	

Part: FUEL CONTROL CAMS	CONVENTIONAL METHODS	EX-CELL-O NUMERA-TROL
Lead time	150 hrs.	40 hrs.
Machining per/piece	80 hrs.	7.5 hrs.
TIME SAVED	182.5 HOURS	

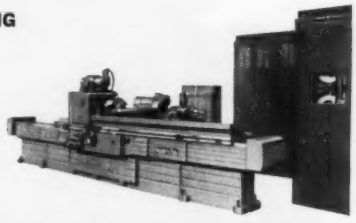
Part: STEAM TURBINE BUCKETS	CONVENTIONAL METHODS	EX-CELL-O NUMERA-TROL
Lead time	144 hrs.	24 hrs.
Machining per/piece	90 hrs.	12 hrs.
TIME SAVED	198 HOURS	

STYLE 922 PRECISION CONTOURING MACHINE
Slides are controllable to .000025". Grinding unit is interchangeable with boring and turning unit.



PRECISION CAM-MILLING MACHINE
Slashes lead time in producing drum-type cams.

PRECISION PROFILING MACHINE
Performs intricate and accurate milling and grinding of 3-dimensional forms.



Are you faced with tough prototypes or production parts that "can't" be produced economically? See your Ex-Cell-O Representative, or write direct for details on how you can apply Ex-Cell-O's Numera-Trol system of tape-controlled precision machine tools to do more jobs, faster and more accurately!

FREE—"A Guidebook to Numerically Controlled Machine Tools." Send for your copy today.

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION

NUMERA-TROL (XLO)

60-44

EX-CELL-O FOR PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • CONTOUR PROJECTORS • GAGES AND GAGING EQUIPMENT • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • ATOMIC ENERGY EQUIPMENT • RAILROAD PINS AND BUSHINGS • DAIRY AND OTHER PACKAGING EQUIPMENT

Machinery Division

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

at the MTE...
see the outstanding features of the

allNEW

be sure to see
LANDIS
the years ahead line of
precision grinders . . .

▲ New Landis 6" semi-automatic type R plain cylindrical grinder

◀ New Landis type R universal cylindrical grinder

LANDIS
PRECISION GRINDERS

. . . now Landis offers the only new complete line of Plain and Universal Grinders with all these features. All new designs engineered for precision and production . . . not features hung on or added to an obsolete design.

allNEW wheel feed:
at eye level with turning handwheel during grinding feed for easier setup and operation

allNEW plain grinder truform dresser:
with both slides on preloaded balls for exact profiling

allNEW beds:
no hydraulic oil or open drains in bed—maintains better machine alignment

allNEW plain grinder footstock:
preloaded ball spindle for no shake and maximum stability

allNEW universal internal fixture:
compact, swing type—easy to position

allNEW universal feed:
for semi-automatic operation

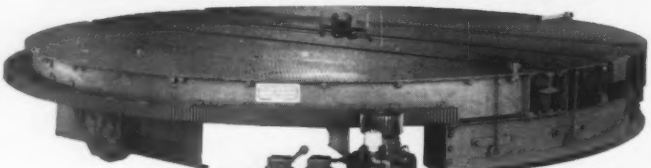
and MICROFEED
a major breakthru in size control—available on these machines

LANDIS
world leader in precision grinders

Landis Tool Company, Waynesboro, Pennsylvania

for turnaround convenience

ATLAS turntables



30-Ton, 16-foot Turntable with "push-pull" mechanism and 90° power rotation.

Atlas turntables are made to customer specifications in any size and capacity; for manual or power rotation. Either flush or raised rail arrangement can be provided, with rail size and gauge to match existing track.

Request

Bulletin 1297

Since 1896 . . . Engineers-Builders of Ore Transfers . . . Scale Cars . . . Coke Quenchers . . . Coal Larries . . . Door Machines . . . Safety-Type Transfers . . . Storage Battery Locomotives

ATLAS CAR & MFG. COMPANY

1140 IVANHOE ROAD

CLEVELAND 10, OHIO

CALENDAR
OF MEETINGS

July 10-13, Truck-Trailer Manufacturers Association: Summer meeting, Homestead Hotel, Hot Springs, Va. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

July 11-12, Metallurgical Society of AIME: Conference on response of materials to high velocity deformation, Estes Park, Colo. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

July 22-24, National Association of Metal Finishers: Annual meeting, Statler-Hilton Hotel, Los Angeles. Association's address: 60 Bently Rd., Cedar Grove, N. J. Executive director: P. Peter Kovatis.

July 24-28, American Electroplaters Society: Annual meeting, Statler-Hilton Hotel, Los Angeles. Society's address: 445 Broad St., Newark 2, N. J. Executive secretary: John P. Nichols.

Aug. 8-12, American Institute of Electrical Engineers: Pacific general meeting, U. S. Grant Hotel, San Diego, Calif. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Aug. 15-17, American Society of Mechanical Engineers and American Institute of Chemical Engineers: Heat transfer conference and exhibit, Statler-Hilton Hotel, Buffalo. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Aug. 16-19, Society of Automotive Engineers Inc.: National West Coast meeting, Jack Tar Hotel, San Francisco. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 3-4, American Machine Tool Distributors Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Sept. 6-16, National Machine Tool Builders Association: The Machine Tool Exposition—1960, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 6-16, Production Engineering Show: Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 7-9, American Society of Mechanical Engineers: Instrument and regulators conference, Massachusetts Institute of Technology, Cambridge, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

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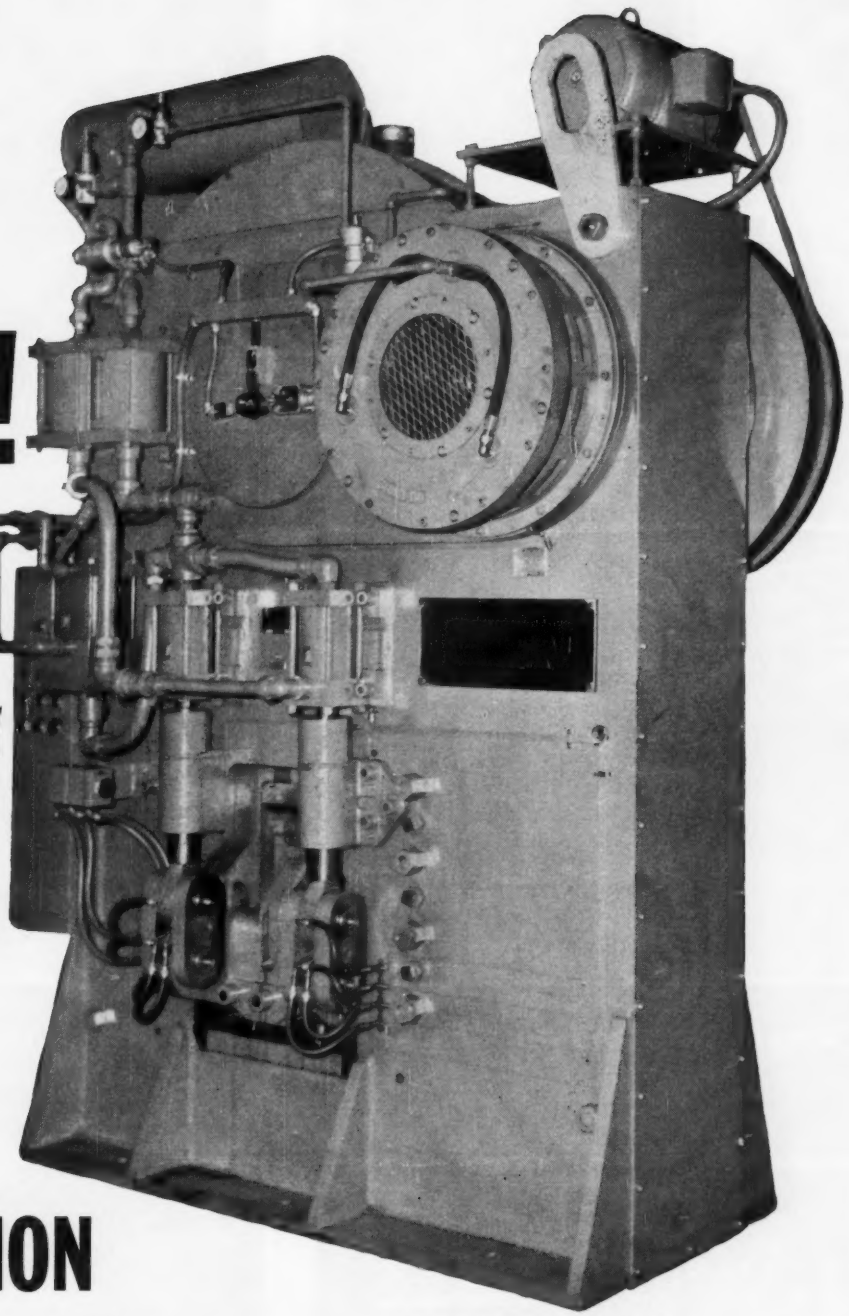


'BUFFALO' 400 BILLET SHEAR

Up to 18,000 Cuts per 8 Hour Shift

THAT'S PRODUCTION

Discover how the *New* 'Buffalo' 400 Billet Shear can save time and boost production on your billet cutting operations. Contact your machine tool dealer, or write direct.

SPECIFICATIONS

Ram Tonnage	400 tons
Strokes per minute (free running)	60
Round Billets, Mild Steel	4½" dia.
Square Billets, Mild Steel	4" sq.
Flat Bars	12" x 2"
Knife Size	3" x 7½" x 13"
Motor Horsepower	20 HP Normal
Maximum Round or Square Size Without Modification	5" Sq. or Round
Machine Stroke	2"
Machine, Net Weight	32,000#
Length x Width x Height	80½" x 52" x 116½"

See 'Buffalo' Machine Tools in action at the Machine Tool Exposition . . . Booth 551

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

MACHINE TOOL DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

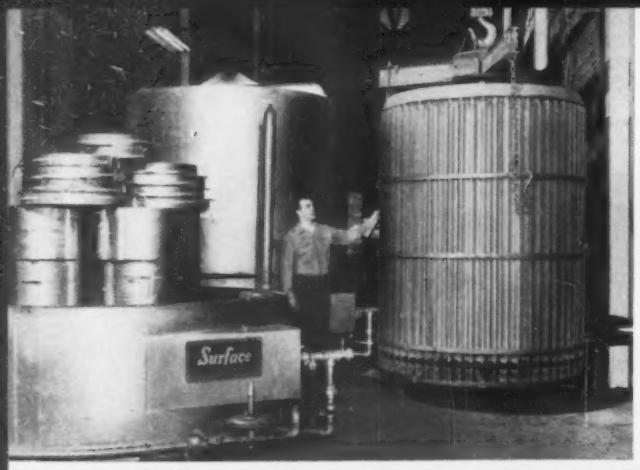
MMT-PE

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

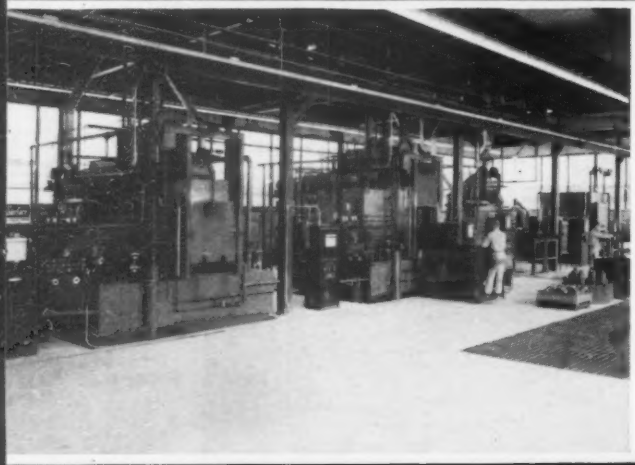
'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.



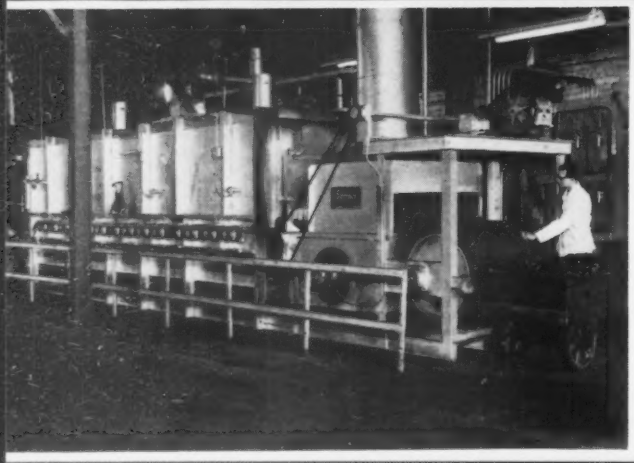
Cupro-nickel coils

Aluminum coils

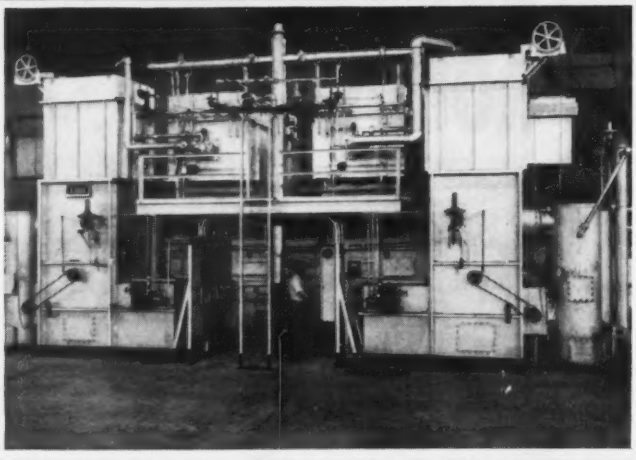


Steel gears and pinions

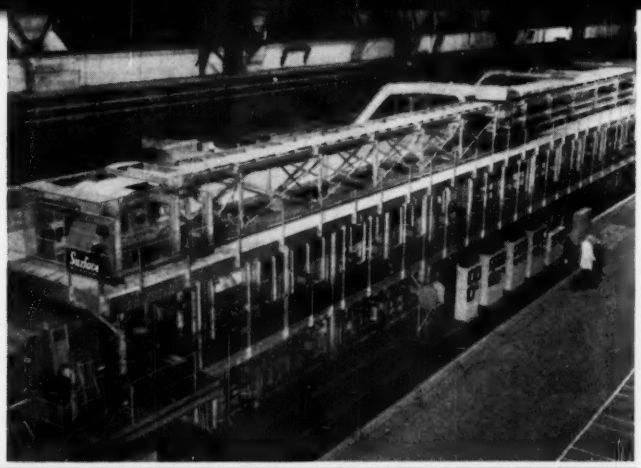
Aluminum billets



Automotive steel forgings

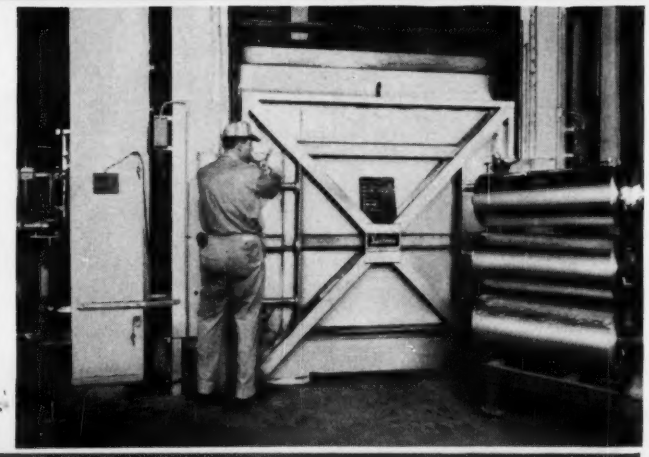


Brass tubing



Steel strip

Brass wire



Aluminum foil

How Surface Power Convection* Equipment increases speed and uniformity of heat treatment

Rates of heat transfer by radiation are limited by maximum available "thermal heads," various shapes and heat absorption properties of work pieces, and control problems which become critical when rate of heat transfer is very high.

On the other hand, heat transfer by convection can take place at rates of extreme speed, with air temperature very close to the desired work piece temperature, assuming very high air velocities.

To get such high air speeds in the first place (with fans running close to the strength and temperature limits of the best alloys available) and then use the heated air effectively in heat treating are two major problems which Surface began to tackle years ago. Gradually Surface furnaces were designed more and more like wind tunnels.

So effective are Surface's new techniques in convective heat transfer, that we can now define a furnace in terms of its **convection power:** its ability to heat the work primarily by convection, with great speed, uniformity, and efficiency.

Some of the results are spectacular; all have brought about important cost savings or product improvement. We invite you to write for Bulletin SC-182 describing Surface Power Convection equipment in more detail. Surface Combustion, 2385 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ont.

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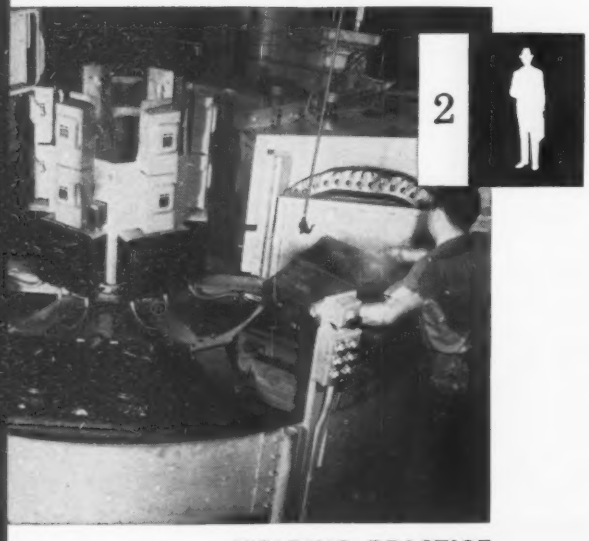
A division of Midland-Ross Corporation MR

Surface®

REPUBLIC FOUNDRY SERVICE ENGINEERS CAN HELP YOU PRODUCE

PATTERN MAKING



MOLDING PRACTICE

Republic Foundry Service Engineers offer you more than metallurgical assistance. Their practical foundry experience and thorough knowledge of pig iron behavior qualifies them to assist you in every department of your foundry operation as illustrated on these pages.

They have at their fingertips information on and a working knowledge of the latest processes and techniques available for improving castings, and for expanding their use and sale. Their suggestions often result in improved operating procedures, increased production efficiency, and in recapturing business lost to other materials.

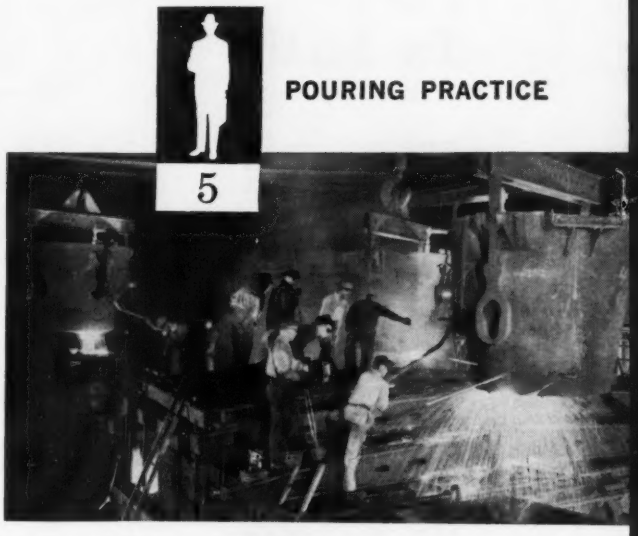
When it comes to the important matter of pig iron selection, the Foundry Service Engineer recommends

MATERIAL SELECTION

MELTING PRACTICE

BETTER CASTINGS, PROFITABLY

POURING PRACTICE



the grade best suited to your requirements. He shows no prejudice, applies no pressure to promote one grade of pig iron over another, because Republic produces the most complete line in the industry. Northern grades include Chateaugay, Foundry, Malleable, Bessemer, and Basic. Southern furnaces produce Foundry and Basic.

Foundry Service Engineers form the basis of Republic's Complete Foundry Engineering Service—a concept designed to help you produce better castings more efficiently, economically, and profitably. Foundry Service Engineers are available to all foundries without obligation. Mail the coupon for prompt service, or for more information on Republic's complete line of irons.

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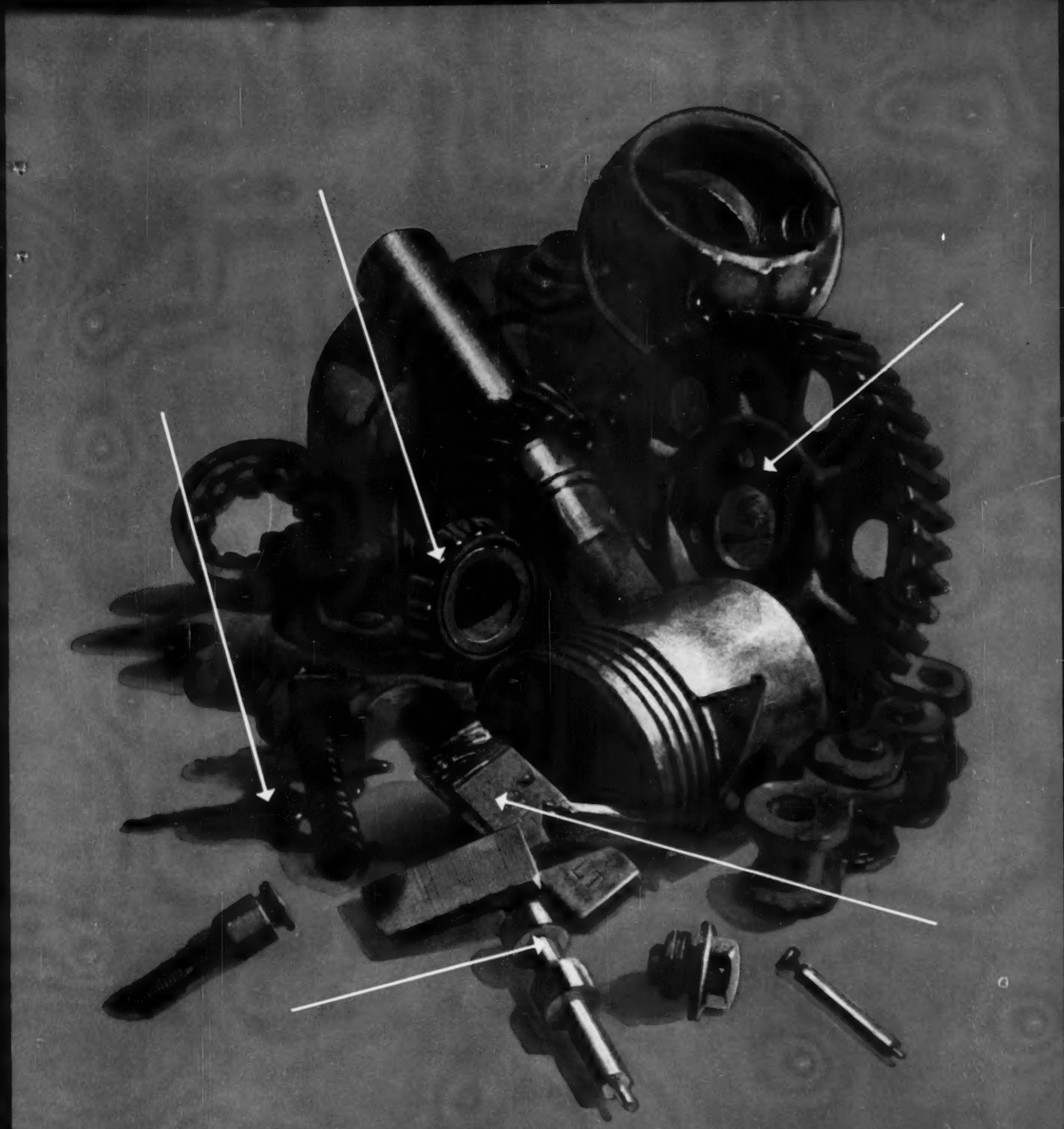


How to starve a scrap pile* at its source

* and all it represents

(DAMAGED TOOLS, RUINED MACHINES, REJECTS, WASTED LUBRICANTS, UNSCHEDULED DOWNTIME...)

TEXACO

Start a "STOP LOSS" program

Bearings ruined before their time by improper lubrication
Downtime caused by a man with the wrong grease gun
Lubricants wasted by over-lubrication
Damaged tools — burned and cratered by using the wrong type of cutting oil
Rejects from faulty cutting and grinding

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

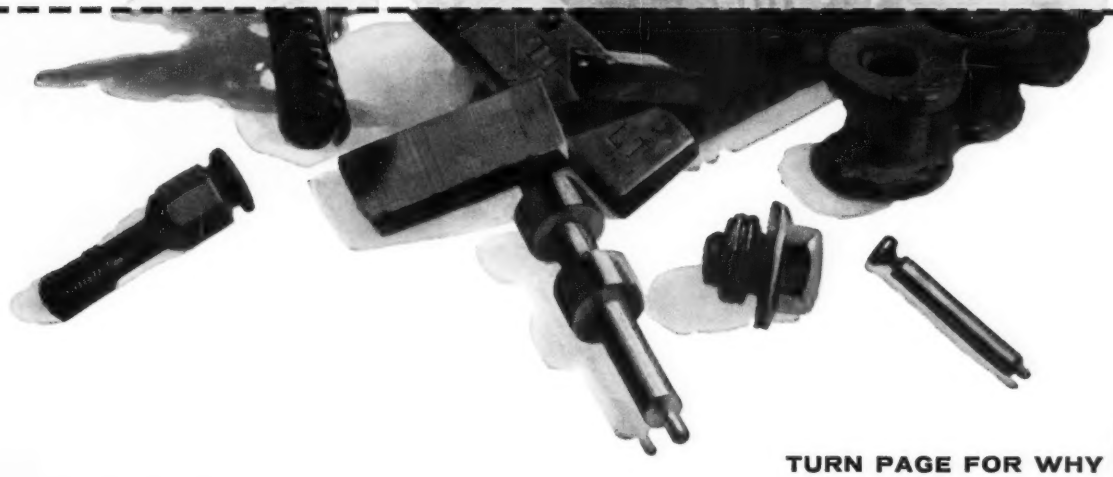
Texaco's "Stop Loss" program has been developed for progressive managers in production, maintenance, purchasing, engineering and accounting who wish to apply new methods to control costs and add to profits.

The program has two purposes: (1) to demonstrate how organization of lubrication practices can be used to control costs resulting from product rejects, downtime, machine repair, excessive inventory, and (2) to provide specific instruction material to help plant groups find out where and how they can use Organized Lubrication to control costs in their own operations.

Lubrication is common to almost all plant functions. So don't be surprised when the "Stop Loss" program reveals ways to save in many places!

START TODAY! cut down on your future scrap piles!

Just tear along this line



TURN PAGE FOR WHY

Expect tangible results!

HERE'S WHY AND WHERE:

In 1959, hundreds of plants organized their lubrication practices to reduce costs.

Their managements had recognized this fact: *Lubrication is no longer just a routine operating procedure. It is a key factor in controlling costs and, as such, rightly becomes a management function.*

This doesn't mean that management must put on overalls and grab a grease gun. But when management recognizes the dollars-and-cents significance of Organized Lubrication, they have made the first step toward reduced costs throughout the plant.

The Texaco Organized Lubrication Plan studies your lubrication methods in terms of long-range savings in production, equipment life, manhour utilization and inventory. A re-evaluation in terms of Organized Lubrication usually reveals how immediate savings can be made and continued.

Texaco has developed techniques and experience to make this new concept operative. They are offered to you, with the understanding that any Organized Lubrication program depends for success on those who adopt it and apply it.

Here's the help you need to starve YOUR scrap pile

Here are the parts of the Texaco Organized Lubrication Plan available to interested plant groups:

1. "Stop Loss with Organized Lubrication," a new 25-minute color and sound film created to show the opportunities for cost control through "Organized Lubrication."

2. A film "package" for plant departments. This consists of movies on cutting oils, greases, hydraulic oils, etc., that may be selected for showing after seeing the "Stop Loss" film.

3. Coordinated booklets on the film subjects and others to be used as guides in specific areas.

4. A Texaco Lubrication Control System to take the guesswork out of your lubrication scheduling. This simple system costs almost nothing to install, yet can save up to 15 per cent of your maintenance costs.

We can promise you that a modern Texaco Organized Lubrication Program will produce a package of economies in your plant. Texaco Inc., 135 E. 42nd St., N. Y. 17, N. Y.

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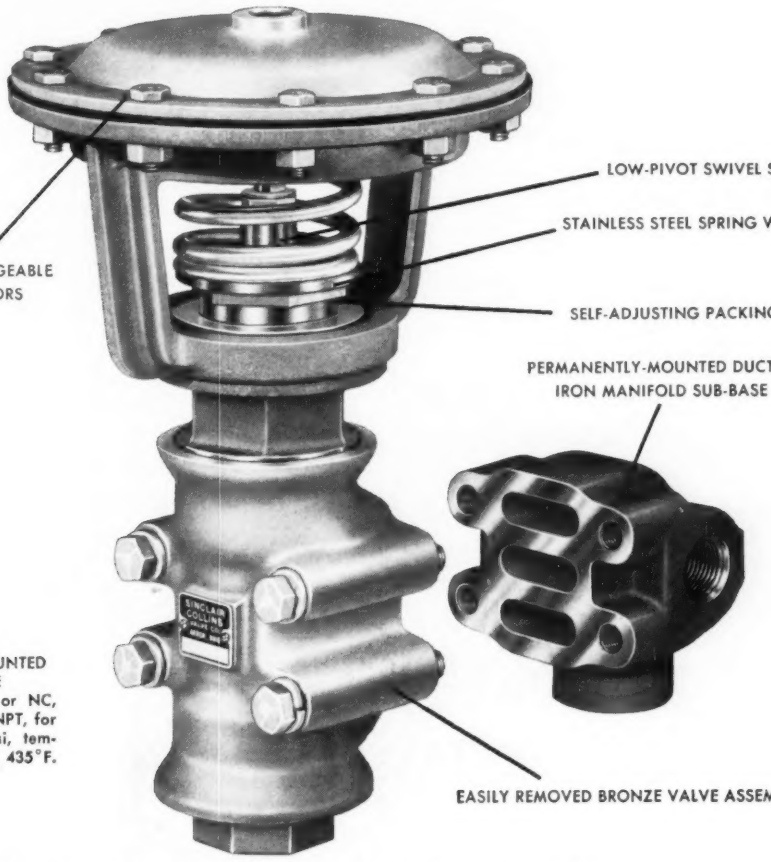
Sign and mail it today!

NEW- SINCLAIR-COLLINS

1/2" manifold-mounted steam valve



S-C MANIFOLD-MOUNTED STEAM VALVE
2- and 3-way NO or NC, tapped ½- or ¾-in. NPT, for pressures to 350 psi, temperatures from 0 to 435°F.

Want excellent flow characteristics and bubble-tight sealing? Want maximum service life and minimum downtime for maintenance? Want compact, versatile design and ease of installation? Then you'll specify Sinclair-Collins' new manifold-mounted steam valve.

S-C's low-pivot hollow swivel stem places the pivot point *within* the extra-long bearing area to minimize side thrust and wear . . . provides maximum packer life. Self-adjusting spring-loaded Teflon chevron packing requires no attention. Piloting of all assembled components eliminates misalignment of stem. These features, plus Sinclair-Collins' precision manufacturing techniques are your assurance of long trouble-free valve life.

What's more, S-C's new valve can be converted from NO to NC, or vice versa, by rotating it 180° on the manifold sub-base.

Some day, maintenance will be necessary . . . it's simple . . . just loosen four mounting bolts, remove the valve for later bench servicing and install a replacement . . . downtime can be measured in minutes!

Find out how this advanced design valve can improve the performance of machines you have in service or on the drawing board. Your Sinclair-Collins field engineer has all the details.

For more information, write for free Bulletin MV-60. Address The Sinclair-Collins Valve Company, 454 Morgan Avenue, Akron 11, Ohio, Dept. ST-760.

The SINCLAIR-COLLINS VALVE Co.

DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)
AKRON 11, OHIO

8128

AT BLACK & DECKER

Jalcase 100 Cold Finished Bars Speed Tool Parts Production 50%

Here's what happened when Black & Decker Manufacturing Co., Towson, Maryland, switched from alloy grades 4140 and 8620 to J&L Jalcase 100 cold finished bar steel in the production of shafts, gears and pinions for portable electric tools:

- The free machining quality of Jalcase speeded production on automatic screw machines 50%.
- The uniform machinability of high strength Jalcase eliminated ½ hour per shift from machine downtime for tool changes.
- The strength and hardness of Jalcase have practically eliminated the need for subsequent heat treating and resultant part distortion.
- The combination of these production economies plus the lower initial cost of Jalcase over alloy grade steel has greatly reduced parts costs.

The free machining qualities of J&L Jalcase 100 plus its high strength, hardness and stabilized stresses make it an ideal cold finished bar steel for producing high quality machined parts for the metalworking industries.

Jalcase 100 has a minimum yield strength of 105,000 psi in round bar sizes to 1½" diameter and a minimum yield strength of 100,000 psi in sizes to 3½" diameter.

Jalcase 100 has a minimum hardness of 248 Brinell up to 1½" and 241 Brinell for larger sizes. It is also available with a lead addition, designated as Jalcase 100-L, for applications requiring superior machinability.

For literature write direct to *Jones & Laughlin Steel Corporation, Department 480, 3 Gateway Center, Pittsburgh 30, Pennsylvania.*

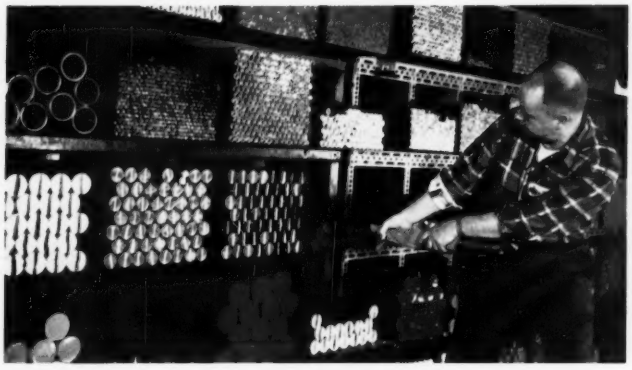
Steel

This Steelmark identifies products made of steel. Place this mark on your products. And—look for it when you buy.

Jones & Laughlin Steel Corporation

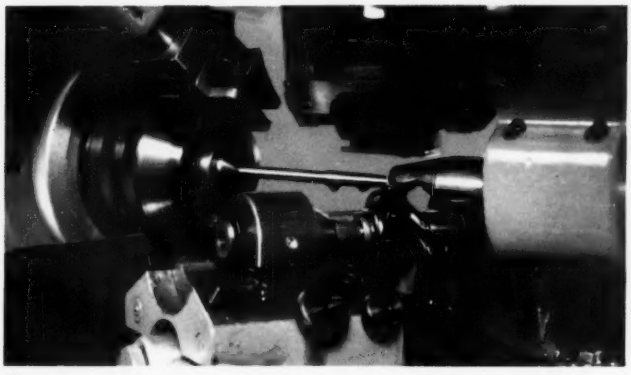
PITTSBURGH, PENNSYLVANIA

Where cold rolled steels originated in 1859



Black & Decker relies on a great variety of J&L bar stock. Over 30 electric tool parts are made from Jalcase 100 alone.

Made from Jalcase 100, these armature shafts are used in Black & Decker's ¼" Portable Electric Utility Drill.



▲ Black & Decker hobs pinion gears made of Jalcase 100 to tolerances of less than .001".

◀ Palletized trays transport a few of the many B&D machined parts that are made from J&L bar stock.

J&L STEEL

Flash butt-welded ring from extruded material slashes away 64 lbs. of stainless 310

Only 1/3 as much material was required when a special extruded section was substituted for bulky bar stock in this flash butt-welded ring. By leaving 2/3 of the material at the mill, instead of hogging it out, Amweld saved its customer $76.83 per ring—plus hours of expensive machining. (Savings compared to the forgings originally used are even greater.)

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and complete machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

How Second Half Shapes Up; Good Year in Prospect

	2nd HALF	1st HALF	1959	1960	INCREASE
Metalworking sales (billions) .	$77.5	$74.5	$145	$152	5%
Gross national product (billions, annual rate)	$510.5	$501.5	$479.5	$506	5%
Capital goods expenditures (billions, annual rate)	$37	$36	$32.5	$36.5	13%
Metalworking equipment purchases—orders placed (billions) ..	$2.5	$2.2	$4.0	$4.7	17%
Steel Production (millions of tons)	52	61	93.4	113	21%
Passenger car output (millions of units).....	2.8	3.8	5.6	6.6	18%
Aluminum production (millions of tons, primary)	1.05	1.05	1.95	2.1	7%
Refined copper production (millions of tons)	0.83	0.77	1.22	1.6	31%
Slab zinc (millions of tons)	0.5	0.47	0.86	0.97	12%
Personal income (billions, annual rate)	$404	$396	$380.2	$400	5%
Consumer expenditures (billions, annual rate)	$332	$324	$311.6	$328	5%
For durable goods ...	$47.5	$44.5	$43	$46	7%
For nondurables	$156	$152	$147.9	$154	4%
FRB Index (1947-49=100) ..	168.5	166.5	159	167.5	5%

Economist Is Bullish, but Gently So

"There are no major economic maladjustments emerging in the economy. The modest expansion now underway should continue the rest of the year and well into 1961." That's what persons attending the national Chamber of Commerce meeting last week heard from Dr. Emerson P. Schmidt, director, economic research, U. S. Chamber of Commerce. He predicted: Government expenditures will rise . . . exports are rising . . . residential construction will improve . . . steel production will be stepped up within 60 days . . . plant and equipment spending will expand further . . . Great public response to '61 auto models is probable . . . GNP should rise another $10 billion to $15 billion by yearend.

Banker Bearish, but Sees Money Easing

"I see no basis for anticipating a strong upsurge in economic activity . . . I think the odds are good that we will be in the downward phase of the business cycle within a year from now, with a possibility that the cyclical turning point may be reached in the latter part of 1960." That's what the national

Chamber of Commerce heard last week from Frank E. Morris, research director, Investment Bankers Association of America. He added that the FRB is likely to loosen the money reins promptly upon any further showing of weakness in the economy.

Inland's Block Still Sees Near-Record Steel Production

Joseph L. Block, chairman, Inland Steel Corp., believes the industry will produce 115 million to 118 million ingot tons of steel this year. He looks for second half output of 54 million to 57 million tons (vs. about 61 million in the first half). He cautions that the order rate will have to pick up within 30 days for his prediction to be met. It calls for an average operating rate in the high 70s this year—and in the low 70s for the second half. He had estimated 130 million tons at the beginning of the year, said he was "ready to eat crow" but would "have plenty of company."

J&L's Beeghly Predicts 80% Operating Rate for Year

Charles M. Beeghly, president, Jones & Laughlin Steel Corp., says his company expects to average 80 per cent of capacity for 1960. It operated at 100 per cent in the first quarter, is now near 60 per cent. "I believe there is more pessimism today regarding the health of the steel industry than the situation merits," he asserts. He points out that consumption is exceeding production and the time "is not far off" when the two rates will be equal again. He thinks that will happen "no later than August."

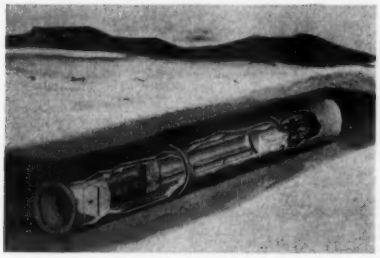
'Man on Street' Now Notes Foreign Competition

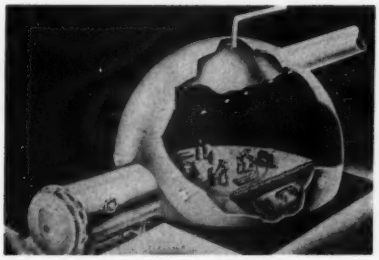
"The invasion of domestic markets by foreign competitors is now evident, finally, even to the man on the street," declares Col. W. F. Rockwell, chairman, Rockwell Mfg. Co., Pittsburgh. "In Western Europe, steel mills are running at capacity and requiring home customers to place orders ten months in advance of delivery. Some West German manufacturers are importing labor from Italy and France. When the European boom is over, this country will be flooded with imports and the 60 per cent steel operating rate could be knocked flat," he asserts.

Georgia May Get Steel Mill by 1965

Deposits of high grade iron ore discovered in southwest Georgia may lead to a steel mill there (in Quitland County) by 1965. The Strategic-Udy process would be used. Robert F. Lynch, executive vice president, Pataula Mining Co., Cuthbert, Ga., says: "We're sure of the quality of the ore but not sure of the size of the deposits." He estimates the ore has a 55 per cent iron content (vs. about 50 per cent for Mesabi ore). Geologists are investigating the ore fields; their report should be ready late this month.

Army Studies Moon Base Needs





Prefab modules, like the one at left above, might house the first Moon explorers. Each complete module would be carried there by one cargo rocket, then buried for insulation and protection against radiation and meteorites. Small nuclear reactors might provide heat and power. In the photo (l. to r.): Air lock, air conditioning and power console, sleeping quarters, cooking area. The Army Corps of Engineers has completed preliminary design of an environmental simulator (photo at right) to aid in designing Moon facilities.

West Coast Firm Set to be Primary Aluminum Producer

United Pacific Aluminum Co., a Los Angeles fabricator, is set to become the nation's seventh producer of primary aluminum if it can get a firm guarantee of adequate power for its proposed Longview, Wash., reduction plant. Indications are the company plans initial production of 20,000 tons yearly and eventual capacity of 40,000 tons.

Castro Offers to Buy Nicaro from U. S.

Representatives of Castro's government huddled behind closed doors with State Department officials in Washington last week. Their mission: Cuba is offering to buy the U. S. government-owned Nicaro nickel facilities. Look for hot reaction from Congress—nobody wants the nickel to end up behind the Iron Curtain.

Power from Thermoelectric-Thermionic-Nuclear Unit

Dr. W. E. Shoup, Westinghouse scientist, holds the thermoelectric-thermionic test device that was built into a nuclear fuel rod to produce electric power directly from the fuel elements in a reactor. A thermionic generator is the core; a thermoelectric generator is built around it. So electricity is produced from the reactor's heat with no moving parts. It could spell great future generating efficiency.

May Mixed Month for Metalworking

Net new orders of metal cutting machine tools reached $38 million in May (vs. $36.7 million in April), National Machine Tool Builders' Association reports . . . New orders for industrial supplies and machinery in May rose 1 per cent above the April level, says American Supply & Machinery Manu-

facturers' Association . . . New orders for resistance welding equipment during 1960's first five months are 13 per cent greater than in the like 1959 period, reports Resistance Welder Manufacturers' Association . . . May construction contracts dropped 6 per cent below the May, 1959, level, says F. W. Dodge Corp. . . . May bookings of fabricated structural steel dropped to 269,941 tons from 344,944 tons in April, American Institute of Steel Construction notes . . . May factory sales of home laundry appliances rose 3 per cent above the April mark, reports American Home Laundry Manufacturers' Association. . . . New orders for screw machine products in May dropped 5 per cent from the April level, says National Screw Machine Products Association . . . American Gear Manufacturers Association reports May bookings dropped 1 per cent from the April pace.

Industry Pays More for 1960 Grads

Lehigh University reports these average monthly starting salaries for 1960 graduates (figures in parentheses are 1959 average salaries): Business administration—$445 ($426); arts—$498 ($420); chemistry—$475 ($460); chemical engineering—$515 ($488); civil engineering—$483 ($478); electrical engineering—$540 ($503); engineering physics—$525 ($521); industrial engineering—$510 ($492); mechanical engineering—$528 ($496); metallurgical engineering—$520 ($495); mining engineering—$497 ($495); average engineer—$525 ($495).

Corn Surplus: Key to Use of Low Grade Iron Ore?

Corn, now straining the seams of U. S. surplus bins, may help facilitate the use of low grade iron ore. An ester developed by American Maize-Products Co., Hammond, Ind., could be used as a binder in pelletizing pulverized taconite. "Our product would burn away if used as a binder and not add to the slag problem," says Dr. J. W. Evans, vice president.

Straws in the Wind

The annual clerical costs involved in maintaining a single, four drawer, filing cabinet average about $6000, reports W. L. Davis, vice president, Emerson Electric Mfg. Co., St. Louis . . . The Senate passed and sent to the House a bill to provide $100 million in loans to local governments for development of mass transportation facilities . . . The consumer price index rose to 126.3 in May—up 1.9 per cent from the year-ago level.

Metalworking Pulse

The Business Trend: At 158 (1947-49=100), the industrial production index is about as high as it will get for the next several weeks. Following the July 4 week, low steel operations and automobile model changeovers will hold the index down. **Autos:** Lack of substantial Saturday work reduced car output last week. It will drop considerably more this week because of the holiday. **Steel:** Production at 1,560,000 tons is the smallest (barring last year's strike period) since the week ended July 27, 1958.

- **INDUSTRIAL PRODUCTION**
  - Week ended June 25 . . . **158†**
  - Year ago **173**

  Details on Page 55
- **PASSENGER CAR PRODUCTION**
  - Week ended July 2 . . **133,000***
  - Year ago **108,397**

  Details on Page 52
- **INGOT PRODUCTION RATE**
  - Week ended July 3 . . **54.8%†**
  - Week ago **61.0%**

  Details on Page 98

†Preliminary. *Estimated.

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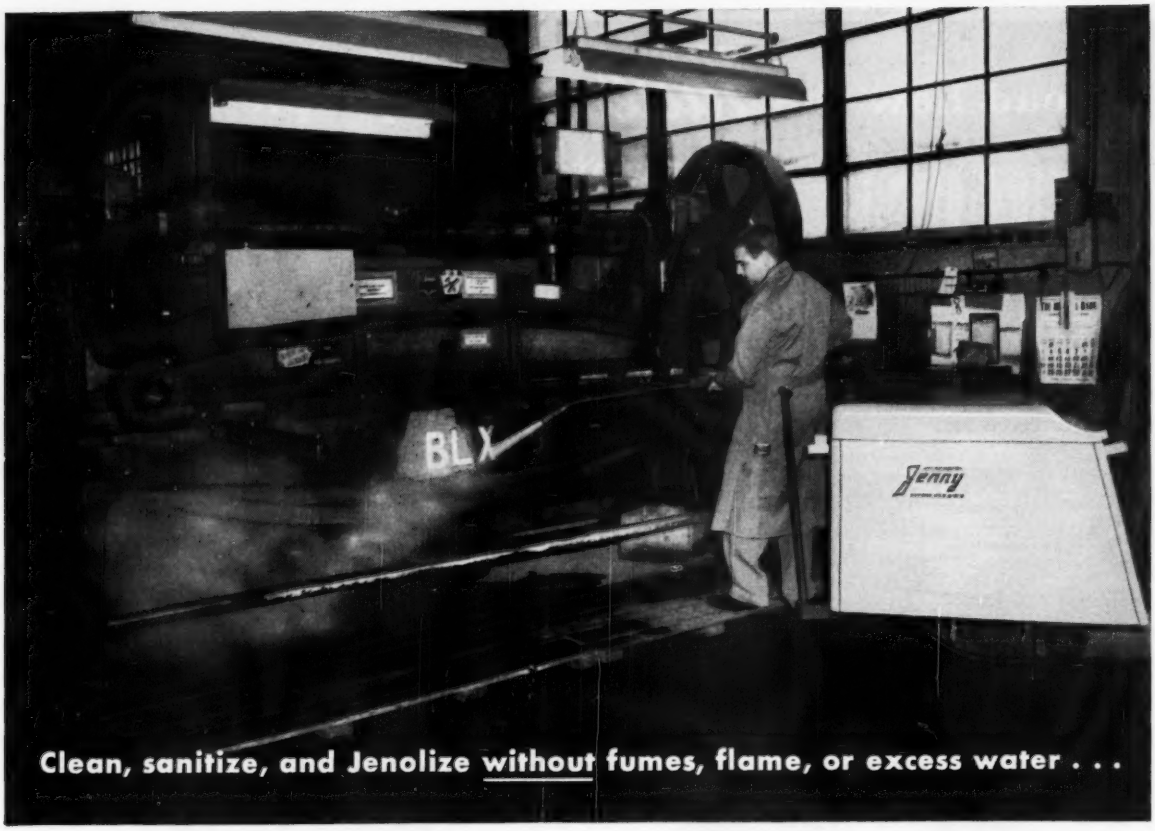


New All-Electric Hypressure Jenny!

Anywhere that flame, fumes, or excess water are objectionable or hazardous, the new Model E-350 All-Electric Jenny® will solve the cleaning or sanitizing problem. And with the new Jenolizing Process, machinery, equipment, and parts are left with a coating that protects against flash rusting, and gives a glossy, like-new appearance to painted surfaces.

Model E-350 combines the right amounts of heat, pressure, and cleaning solution to handle the majority of cleaning jobs at savings of up to 80% in time and labor costs. Its compact size, portability, low water output, and quiet operation without flame, smoke, or fuel fumes, make it ideal for use practically anywhere in the plant.

Send the coupon today for complete information. You'll welcome the outstanding performance of E-350—and the attractive plan which permits you to prove to yourself the economies of this new All-Electric Jenny.

Perfect for

manufacturing plants, food processors, textile mills, chemical and pharmaceutical plants, metal working and fabricating, petroleum industry, canneries, hotels and institutions, and every other operation where fumes, smoke, excess water are objectionable.

Mail Today!

98

Please send complete information on new E-350 All-Electric Jenny and Jenolizing.

Name ..... Title .....

Company .....

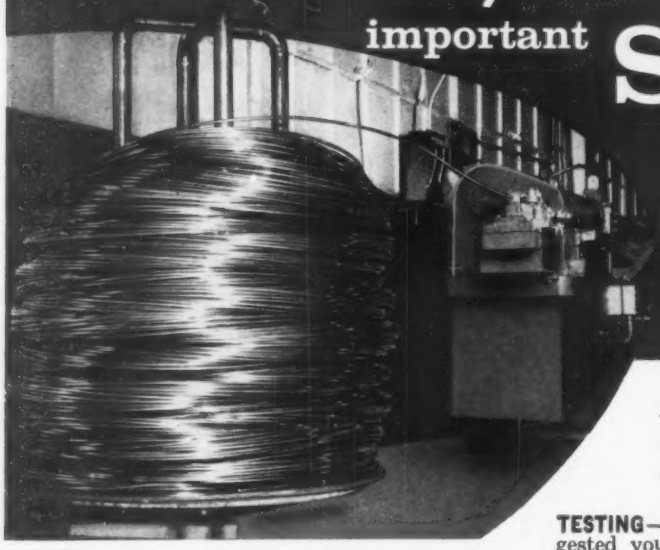
Address .....

City ..... Zone ..... State .....

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
Hypressure Jenny Division, P. O. Box 98, Coraopolis, Pa.

Read how the *Taylor·Tot* people realized important SAVINGS with switch to DSC-PORTSMOUTH LPR COILS



2000 pound LPR's have reduced downtime frequency by about 86%; slashed scrap loss proportionately; upped production 12 to 15%; eased the fabricating job.

Notice the accessible, compact way high-density LPR's stack in contrast to the sprawling heap of 300 pound bundles at right.

PHOTOS COURTESY THE FRANK F. TAYLOR COMPANY, NORWOOD, CINCINNATI, OHIO

The T-95 *Taylor·Tot* Folding Sleeper-Walker-Stroller using DSC-PORTSMOUTH LPR BRITE WIRE COILS for axles, bumpers, supports, utility baskets, canopy frames, etc.

*A DSC TRADE-MARK

Customer "REP" Offices in Principal Cities

COPYRIGHT DETROIT STEEL CORPORATION 1960

Here are direct quotations from a May 27, 1960 letter written by W. N. Muchmore, Vice President of The Frank F. Taylor Company

TESTING—"Several months back your Cincinnati office suggested your long production run coils. Frankly, we were skeptical of the advantages claimed. About six weeks ago, however, we ordered a truckload in 2000 pound coils so we could, from actual experience in our factory, determine if they would be more economical than the 300 pound coils we used for years."

RESULTS

UNLOADING TIME CUT 82%—"Your initial shipment was unloaded with our fork-lift truck by 1 man in 1¼ hours. Like shipments of 300 pound coils always took 2 men 3½ hours each with the same equipment. Reporting the time saved, our receiving clerk questioned, '*Why didn't we do this a long time ago?*' "

STORAGE SPACE HALVED—"The 2000 pound coils stock more compactly than the 300 pound coils, saving us about 50% in floor area for the same weight of wire."

PRODUCTIVITY UP 12 TO 15%—"With the big coils, our two S&C machines straighten and cut 12 to 15% more wire than previously with the small coils and in the same length of time, due to reduced downtime for coil changes."

LESS DOWNTIME, LESS SCRAP, MORE TIME—"With fewer coil changes, we get less coil-end scrap losses and our S&C operator now has time for other work in his department. His reaction, 'It makes my job easier.' "

CUSTOMER SATISFACTION—"The savings realized have more than justified our switching to 2000 pound LPR's. *We can recommend them to any manufacturer still using small coils.*"

Care for more facts about best-in-the-long-run LPR's or other DSC products? Get quick action from your nearest DSC Customer "Rep" or write: Detroit Steel Corporation, Box 7508, Detroit 9, Michigan.

Performance Proved DSC®

DETROIT STEEL

Flat Rolled and Wire Products

Cut Your Materials Costs!

You can be sure that the sixties will bring a wide and tempting array of new and improved materials for use in manufacturing your products.

Three factors are responsible:

- The $10 billion a year the U. S. is spending on research.
- Vastly improved technology.
- Accelerated competition among materials.

There are many examples of what we mean.

One is containers, where the aluminum industry expects to convert the entire 1960-61 orange juice concentrate pack to aluminum and gain a new market for 24,000 tons of material. It has its eye on other market areas.

The steel industry is fighting back with thinner, high strength tin plate and lower prices. The plastics industry is also going after a share of the container market with improved polyethylene materials for utility cans.

Another example is construction, where prestressed concrete is now considered a vigorous competitor for structural steel.

A third is automotive, where the use of aluminum has grown from a prewar average of less than 10 lb per car to over 50. In 1961, Chrysler will equip 10,000 Valiants with aluminum bumpers.

A fourth is the fastener field, where adhesives are considered a serious competitor. Another development: Structural members that are snapped together and require no fasteners.

A fifth is in castings, where the new acetal resins have moved in for a share of the market held by aluminum, brass, and gray iron.

With the materials picture changing so rapidly, the selection of the right material for the job will become tougher and tougher.

It will require the application of what STEEL's editors call Materials Management (Page 45). The materials function is co-ordinated on a company-wide basis, instead of being parceled out among various executives.

To keep your costs competitive, you'll have to base materials selection on a combination of physical characteristics, ease of fabrication, and net cost in your finished products.

Irwin H. Such

EDITOR-IN-CHIEF

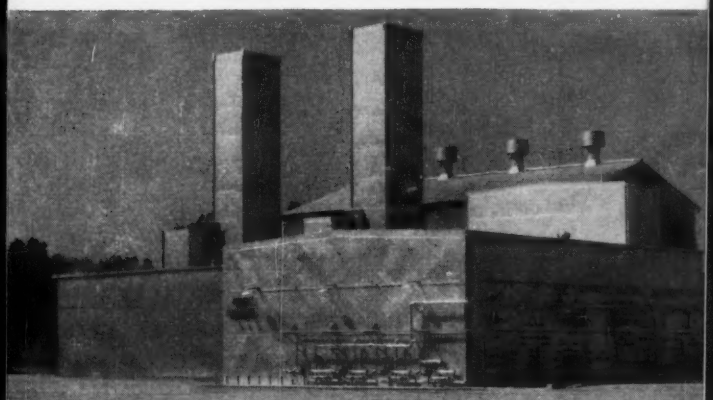
HOW ACME STEEL MADE HISTORY

WITH OXYGEN

In mid-1959, when the first heat was poured at Acme Steel Company's new 35 million dollar plant at Riverdale, Illinois, steel was made for the first time in North America by the combination of continuous hot blast cupolas and top blown oxygen converters. New speed and economy were brought to the production of high quality steel . . . and Acme's finishing mills were assured a supply of ingots at lower cost to serve an expanding list of customers.

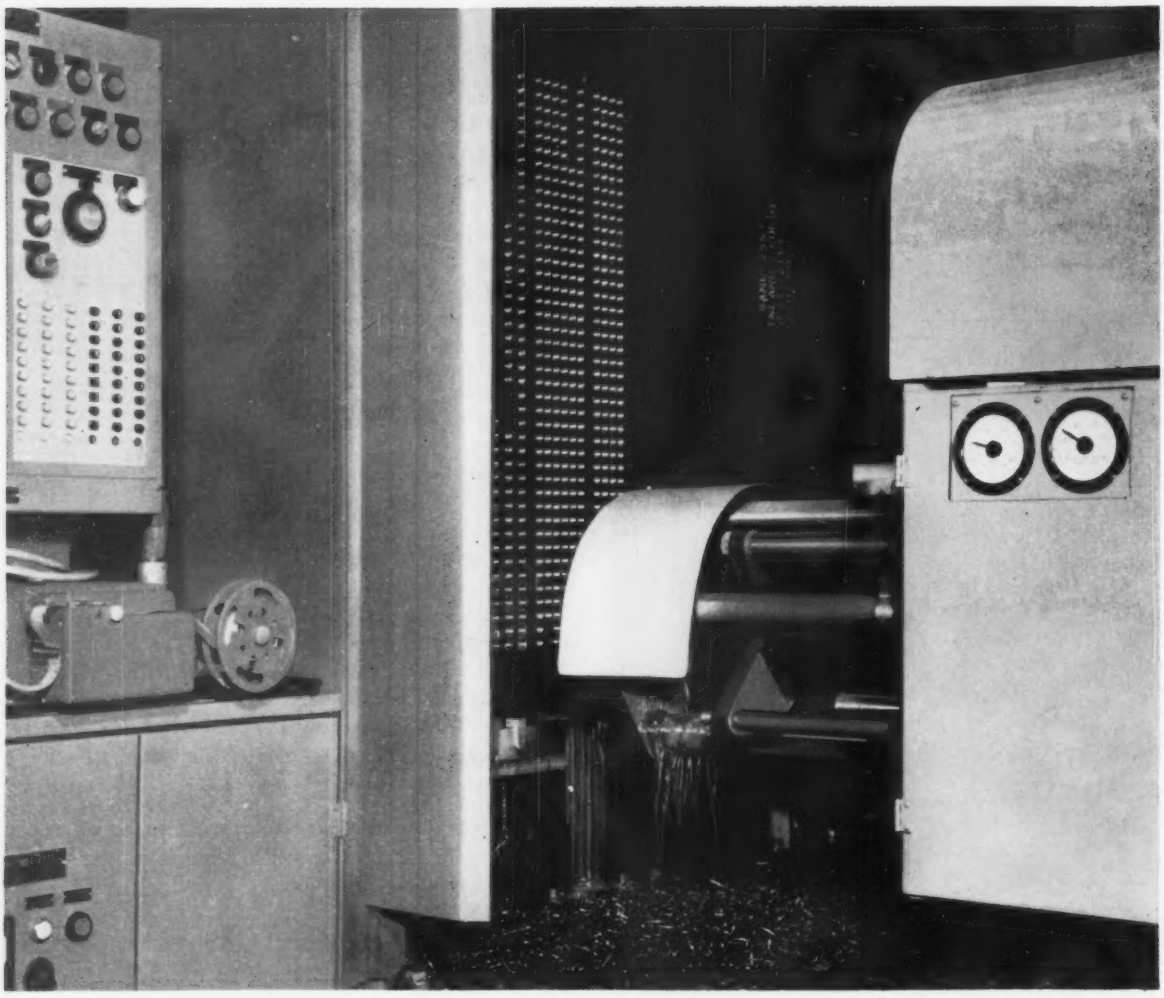
A striking highlight of Acme's accomplishment is that just a few years ago the company did not produce any of its own steel! Semi-finished steel for its hot and cold rolled products was all purchased, subject to constantly changing prices and delivery schedules. When the company planned to integrate its operations, a key factor was a reliable, low-cost supply of high purity oxygen for the converters. Acme called on Air Products for engineering and cost studies, and made the decision. As a result Air Products installed directly adjacent to the mill a generating facility that can supply Acme with more than 80 million cubic feet of high purity oxygen per month, at no capital investment to Acme. Acme's converters get all the oxygen they need at the low cost that makes this new process feasible.

Helping the steel industry put oxygen to work profitably has been Air Products business for over 20 years. On-site generating facilities, pioneered and perfected by Air Products, have made oxygen an easy-to-get utility, sliced its cost by 80%. Progressive steel companies across the nation are taking advantage of Air Products long experience and up-to-date technical services. Let's talk about *your* needs. Air Products, Inc., Allentown, Pa.



Air Products oxygen facility supplying Acme Steel Co.

Air Products
...INCORPORATED



"40 IPM AT *875 rpm*... WE WERE AMAZED"/ *says Walter P. Hill*

DATA:	1020 LEDLOY LEADED PLATE 1½" THICK	1020 NON-LEADED PLATE 1½" THICK
PENETRATION RATE Production Run	40 IPM	20 IPM
DRILL SPEED Production Run	875 RPM	750 RPM
MAXIMUM IPM Test Run	up to 47	up to 28
CHIP CHARACTERISTICS Thickness Temperature Type	.060—.080 cool broken	.040—.060 cool curled

"Ours is a specially designed numerically controlled jig drilling machine with which we obtained penetration rates of 20 Inches Per Minute at 750 RPM in standard half-inch thick 1020 steel plate. However, with the same set-up, we easily obtained 40 IPM at 875 RPM in INLAND LEDLOY leaded steel plate three times as thick and with far better tool life.

■ "Actually, in LEDLOY, we reached penetration rates of 46 and 47 IPM but consider the 40 IPM more practical for production runs. Our programmed test run was made on steady plates for large condensors in which 1½" LEDLOY steel plates were used. As a control, equivalent drillings were made in non-leaded plates of the same chemistry and the same thickness. Our load meter showed the same pulled load on LEDLOY at 40 IPM as we pulled on the non-leaded plate at 20 IPM. Tool life using LEDLOY plates at 40 IPM was equal to tool life using non-leaded plates at only 20 IPM.

■ "We conclude, and without hesitation state, that LEDLOY displayed a marked improvement."

Walter P. Hill, President
WALTER P. HILL, INC.
DESIGNERS AND BUILDERS
SPECIAL AUTOMATED MACHINES
DETROIT, MICHIGAN

LEDLOY®
the world's most machinable steels

INLAND STEEL COMPANY
30 West Monroe Street, Chicago 3, Illinois

THE MACHINE TOOL EXPOSITION — 1960

Spotlight on Numerical Control

LOOK FOR numerical control systems to steal the show at The Machine Tool Exposition—1960 in Chicago Sept. 6-16.

More than 40 exhibitors will display more than 100 machines that are guided by tape control, estimates Dr. John G. Hutton, general manager, General Electric's Specialty Control Dept., Waynesboro, Va.

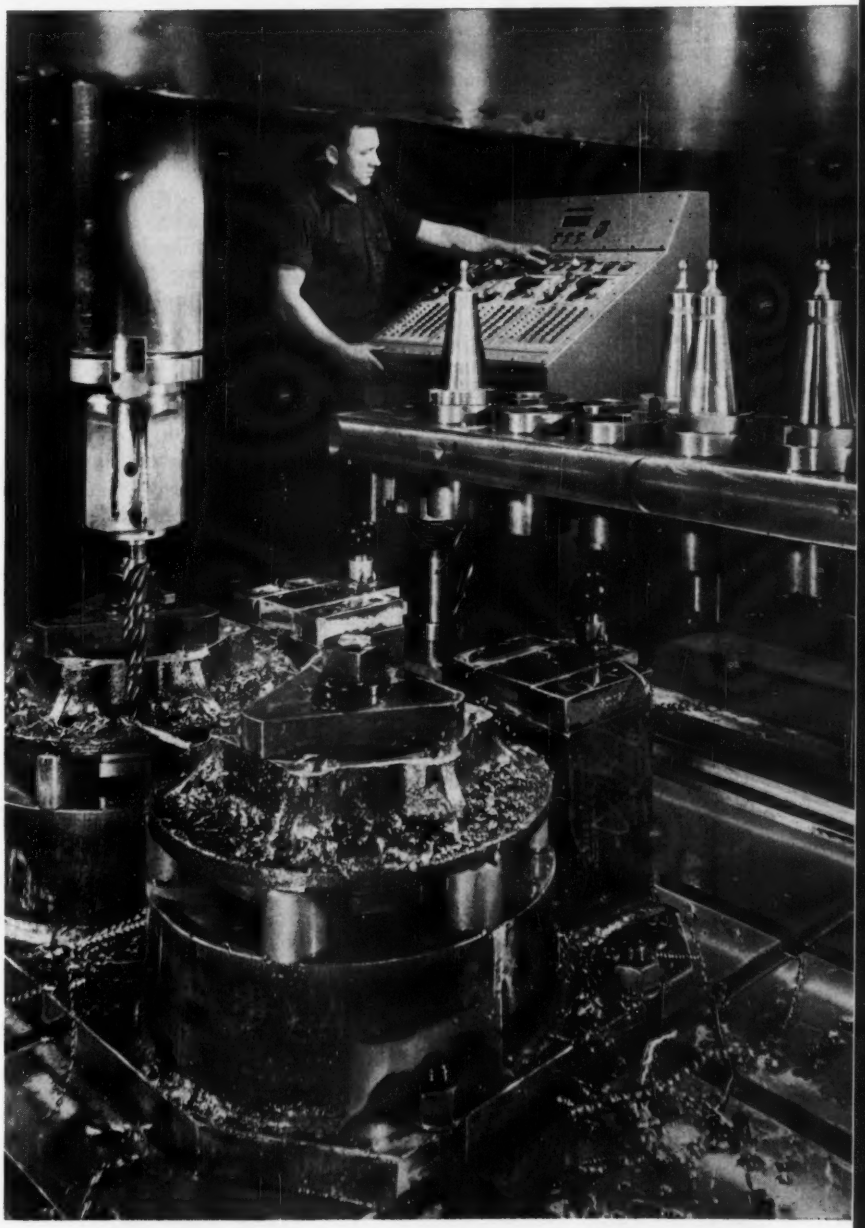
At the last machine tool exposition, in 1955, "there were four machine tool builders showing what can be most accurately described as development models of numerically controlled machines," says Dr. Hutton.

• Machine builders hope tape controlled machines, with assists from other product improvements, will drive showgoers into a buying spree.

April and May orders for metalcutting machine tools ran about $10 million below first quarter levels. All builders are counting on the Chicago exposition to focus more attention on the new machines and perhaps boost sales up to a more profitable level.

Most builders, however, are cautious about estimating the extent of the short term benefit. The surge in orders following the 1955 show must be discounted somewhat because of special orders that won't be repeated this fall. For example, from September through December, 1955, the Air Materiel Command placed orders for $40 million worth of skin mills and profilers. The show had nothing to do with that business.

A STEEL survey shows that only about 25 per cent of the machine tool users are deliberately waiting on purchases until they see what's at Chicago. Most of them know that they can see the machines now in most builders' plants (some already have been shipped to Chi-



As many as 84 tools can be stored in racks (right) and changed automatically on this Lucas precision Versa-Tronic. All machine functions, including tool change, can be directed by tape control

cago) and that they can buy them now if they wish. The factor of delayed buying will probably be a small one.

• Emphasis on numerical control is made with an eye to more business from short lot manufacturers that comprise an estimated 75 per cent of metalworking.

Several builders have dubbed the Chicago exposition the numerical control show. As such, it probably couldn't be better timed, Dr. Hutton implied last week at a Cleveland press conference to introduce the program controlled, automatic tool changing Versa-Tronic machine. It is built by Lucas Machine Div., New Britain Machine Co. (see photo Page 35).

Dr. Hutton stated: "While there has been an almost phenomenal growth in the numerically controlled machine business, we believe that we are observing just the start of the use for this equipment. Only a small percentage of present metalworking installations are employing numerically controlled machines. Yet, their influence is growing so fast that we believe . . . the performance of all machine tools will be measured against the standards set by those which are tape controlled."

At the same conference, President Robert Paxton of GE revealed that "the control industry expects to sell more numerical control systems in 1960 than in all previous years put together."

As to the impact of numerical control on our industrial ability, Mr. Paxton says it is the kind of flexible automation needed to bring both cost and quality advantages to the short production run jobs. "In the light of growing competition for the world's markets, including our own, this kind of flexible capacity is of the utmost importance to manufacturers everywhere. It is insurance that they will lead, not merely meet, competitive demands in the future."

That's the message machine tool builders hope to get across at Chicago. Most builders feel the machines shown will become major weapons in their attack on the replacement market. One builder puts it this way: "We know the need for new machines is critical for many of our customers."

1959 'Productivity' Scores Biggest Gain in Ten Years

Last year's Bureau of Labor Statistics index of real product per manhour hit 131.9 per cent of the 1947-49 base. Individual metalworking industry figures will be available soon

"PRODUCTIVITY" in nonagricultural industries scored a 4.4 per cent gain in 1959, the largest increase in ten years, reports the Bureau of Labor Statistics.

All the increase was concentrated in nonagricultural industries, reversing a postwar trend. Farm productivity has been increasing at an average annual rate of 6 per cent. The nonagricultural industry average (1947-59) has been 3.1 to 3.4 per cent.

BLS officials emphasize that its figures relate output to manhours only. Its indexes do not reflect the contributions of labor, capital, and other production factors.

The index has proved a perennial headache at the bargaining table because unions have used it in attempts to win wage increases commensurate with "productivity" gains. Management has countered that a "true productivity" index would measure the contributions of capital, management, technology, and natural resources in addition to output per manhour.

• Service Industry Factor—BLS officials say that the service industries' figures are included in the nonagricultural classification. No separate statistics for the service segment are available, but officials estimate if it could measure physical output, a substantial increase in productivity would result.

Steel and other metalworking industry executives will be able to take a look at their own industries in a few weeks when BLS releases industry statistics. A good guess for steel: A substantial increase in productivity ('59 vs. '58).

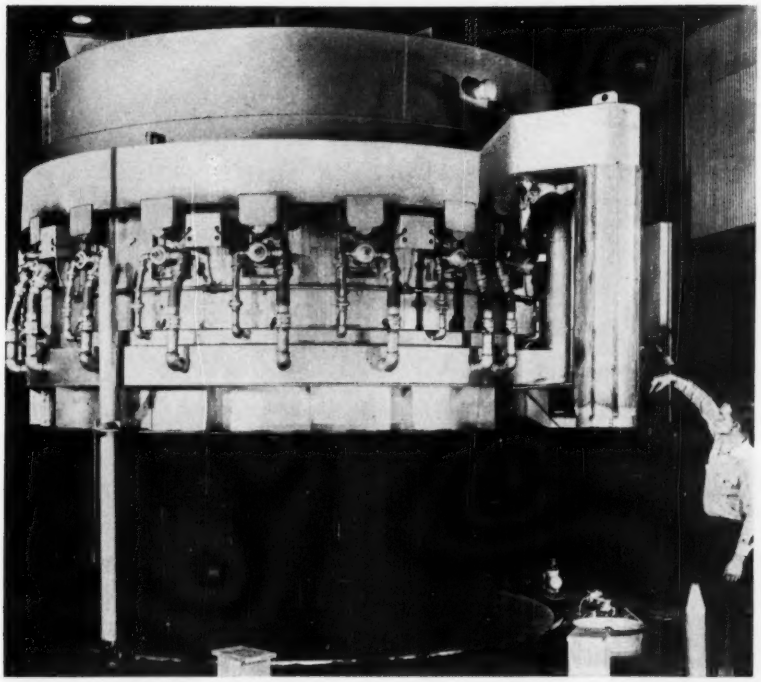
Most economists tend to discount the importance of productivity figures which cover recession years. It takes a ten-year average to give meaning to such statistics, they contend.

Real Product Per Manhour In Nonagricultural Industries

(1947-49 = 100)

1959*	131.9	1954	116.9
1958	126.3	1953	115.1
1957	124.9	1952	112.0
1956	121.5	1951	110.6
1955	121.9	1950	108.8

*Preliminary.



Gas alloying furnaces, designed by Lee Wilson Engineering Co. Inc., enable steelmakers to control precise alloying during the open coil annealing process

Steel Coils Alloyed in Gas

GAS ALLOYING, a method for varying the chemistry of finished, flat rolled steel, has become a production reality. Developed by Lee Wilson Engineering Co. Inc., Cleveland, the new system has the prospect of producing controlled analysis sheets at savings of $10 to $40 per ton.

Potential of the process is dramatized by the fact that 18 major steelmakers, including several foreign producers, already have placed more than $27 million worth of orders with the Cleveland firm.

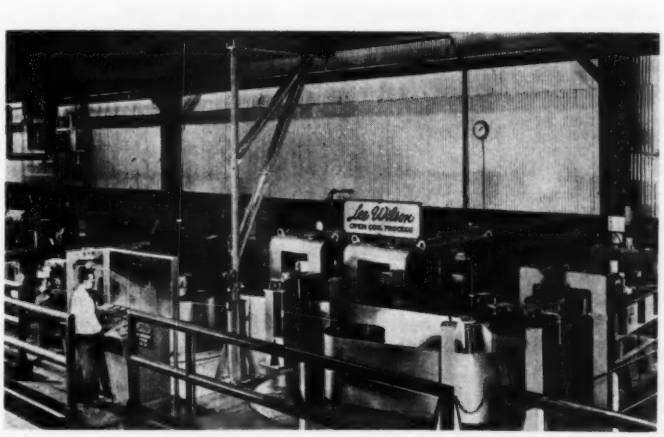
• **How It Works** — Wilson engineers were the first to successfully "open" a coil of steel and handle it in the opened condition during annealing. A nylon cord or corrugated metal tape, inserted between each lamination of the coil, spaces the layers of steel. Hot gases, directed at high velocities through the spaces, heat the coil thoroughly and uniformly in a fraction of the time required for conventional batch annealing.

Now it's economically feasible, says the Wilson firm, to add or remove carbon, nitrogen and other alloying elements that can be gasified in the annealing cycle and change the chemical composition of the steel.

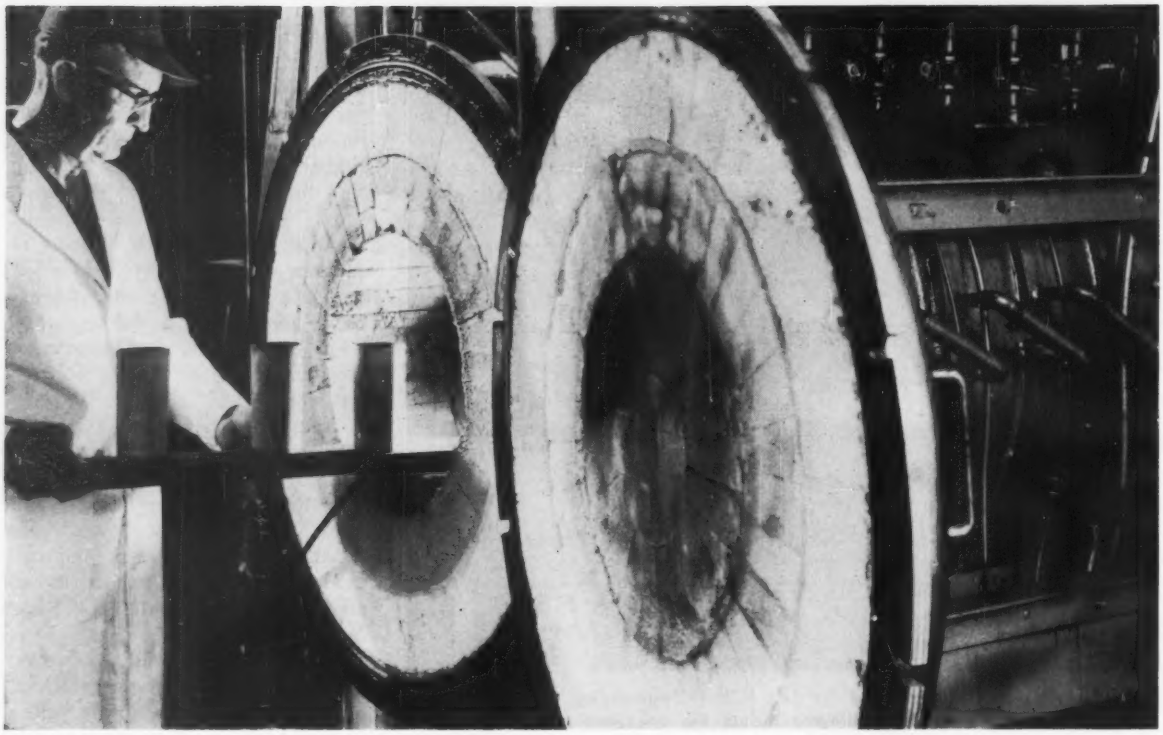
Lee Wilson, chairman, explains the advantages: "Engineers have found tremendous savings in their rolling operation, for they can run the mills at greater production rates. They can produce nonaging steels at lower cost and, because of superior quality control, steelmakers have found they can produce better deep-draw rimmed steel, and a low carbon sheet that becomes an excellent substitute for low percentage silicon steel.

"Engineers have already found they can produce the 'direct-on' or one coat enameling steel long desired by the enameling industry for home appliances at lower cost. Enameling practice has required the application of two coats of enamel, a blue ground coat, and light colored exterior coat. During open coil annealing, however, the carbon content of the steel can be brought to much lower values (less than 0.005 per cent) than can be obtained during melting. Consequently, the ground coat is not needed to insure a high quality exterior coat."

Steel researchers also expect gas alloying: To produce nonaging rimmed steel at cost and quality advantages over aluminum - killed steel; to restore carbon at the surface of high carbon and alloy steel strip that has been surface decarburized during processing; to make soft, easily rolled steels harder and stronger by increasing carbon or nitrogen content during annealing.



This process of opening steel coils is the key to gas alloying



Haynes Stellite Co.

Three metal-ceramic parts are placed in a furnace for sintering. These cylinders were formed by slipcasting

Makers of Ceramics Set for Big Push

ADVANCES are being made throughout the ceramics industry, but none may prove as dramatic as that portion challenging established materials in the metalworking field.

The drama lies in the search for materials capable of coping with the stringent requirements of high temperatures, corrosion, erosion, and other extreme environmental conditions.

• **Cutting Tools**—A comparative newcomer, development of ceramic cutting tools is at the stage carbides were 25 years ago, reports the American Society of Tool & Manufacturing Engineers.

One producer estimates that industry sales in 1960 will be well over $500,000. General Electric Co.'s Metallurgical Products Dept., Detroit, and Carborundum Co.'s Stupalox Project Research & Development Div., Latrobe, Pa., hope to exceed 1959 sales by 50 per cent; Norton Co., Worcester, Mass., predicts its over-all sales (including grinding wheels, refractories, and coatings) will be about 10 per cent higher in 1960.

The best customers for ceramic tools today are the automotive industry and its suppliers. Other promising users: Aircraft and the carbon and graphite industries.

• **Other Uses** — Products include: Ceramic coatings, seals, nozzles, plungers, and valve components. The primary metals and refining industries employ metal-ceramics in the form of thermocouple protection tubes and pouring accessories. Demand is growing for high alumina as a bearing in high speed equipment.

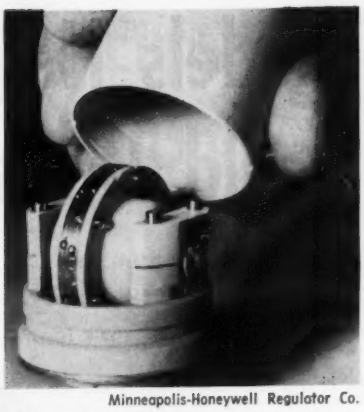
Coors Porcelain Co., Golden, Colo., predicts a 20 per cent or more increase in sales; Centralab Div. of Globe-Union Inc., Milwaukee, estimates a boost of 30 per cent over 1959; Haynes Stellite Co., Kokomo, Ind., a division of Union Carbide Corp., expects its 1960 sales to leap ahead by 150 per cent.

• **Nuclear Industry a Market**—National Beryllia Corp., North Bergen, N. J., has targeted a 1959 sales increase of 40 per cent. Ranked among its top customers: Laboratories working with uranium and other rare materials, metals melting industries, and the electronic industry. The nuclear industry is slated to join this list as the use of ceramics for reinforcement in reactor components expands.

The firm is developing a beryllium oxide ceramic fiber. Preliminary tests indicate high strength

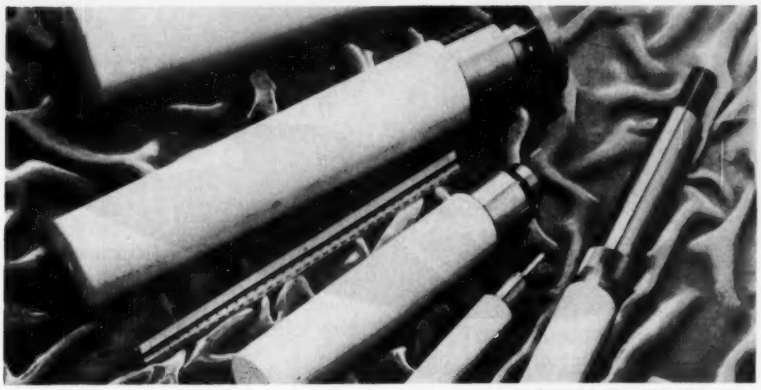
Solar Aircraft Co.

A technician flame sprays alcermet on an aircraft aluminum fire wall for protection to 2000° F



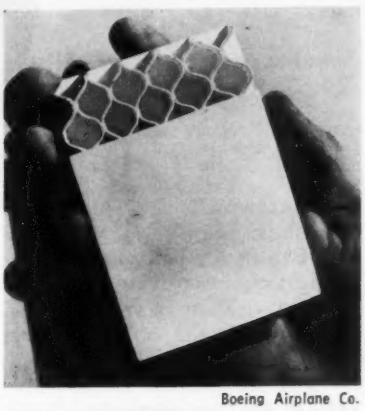
Minneapolis-Honeywell Regulator Co.

A ceramic guidance gyroscope is encased in a ceramic gimbal



Centralab Div., Globe-Union Inc.

These pistons are made of high alumina ceramic for applications where corrosion and physical abrasion problems preclude the use of metal pistons



Boeing Airplane Co.

Ceramic honeycomb specimen produced by a one fire operation

values at high temperatures. The fiber in chopped form can be used to reinforce metal, ceramic, or plastic structural members in the construction of missiles. It will be six months to a year before the material is introduced.

• **Challenge of the Space Age**—Serious consideration of ceramics in aircraft, missiles, and space vehicles is only a few years old. Its potential is illustrated by the growth of research at Boeing Airplane Co., Seattle. Six years ago, Boeing hired its first ceramic engineer; today, the staff comprises about 30 graduate ceramic engineers and associated personnel.

In the past, Boeing pioneered in work on ceramic adhesives and recently licensed their formulation. Other ceramic areas it is investigating: Material for leading edges and nose cones to withstand maximum temperatures varying from 2800 to 4500° F for periods greater than 1 hour; ultrahigh temperature thermal insulation systems for hypersonic vehicle exteriors.

Both Boeing and Rocketdyne Div. of North American Aviation Inc., Canoga Park, Calif., see ceramics replacing molybdenum and tungsten in components requiring high strength-to-weight ratio, good mechanical and thermal shock resistance.

Ceramic coatings, though not as extensively used as some improved high temperature alloys, are still of major importance. Development programs are in progress at Solar Aircraft Co., San Diego, Calif., on plasma sprayed coatings on beryllium and a classified use of ceramic coatings in nuclear reactors.

Flame spraying of oxides in tooling and possible use of ceramic adhesive to increase the temperature range of bonded airframe structures are being investigated at Rohr Aircraft Corp., Chula Vista, Calif.

• **Research and Development**—Lack of ductility is ceramic's biggest disadvantage. The need is to make the material more ductile and to create new design concepts that will permit the use of brittle material. The Defense Department is weighing a proposal for establishment of an information center on ceramic materials and plastics similar to the Battelle Memorial Institute, reports Dr. John R. Townsend, special assistant to the director of defense research and engineering.

• **More Engineers Needed**—Twice as many ceramic engineers and technologists are needed to carry out development programs vital to our missile and space programs, says Dr. John H. Koenig, head of the Department of Ceramics, Rutgers University.

Schools could double their enrollment without need for additional staff or facilities.

Models Help Sell Heald Units . . .

THE PLANT superintendent grudgingly gave the Heald Machine Co. salesman "a minute or two."

The salesman put a model of a universal grinder on the desk. A battery power pack hidden in the base drove a table which reciprocated, a wheel spindle which turned at 9000 rpm, and a workhead which turned at 1100 rpm.

Intrigued, the superintendent called in the chief engineer and two other executives. For an hour and a half, they watched the model actually grinding miniature parts.

Payoff: Within two months, Heald got an order for two universal grinders.

Richard Abbott (left) and Donald Mackay inspect some of the models they made to help salesmen sell machines

• The Worcester, Mass., machine tool builder has been using models to help sell for about two and a half years.

The subsidiary of Cincinnati Milling Machine Co. was sold on the technique by Richard F. Abbott, sales engineer, and Donald A. Mackay Jr., assistant advertising manager (photo, left). They're hobbyists, specializing in modelwork.

Their prices range from $12.50 to nearly $1000. They don't make models for all of the 150 different types of Heald equipment—just those that need more explanation than others.

• The company finds the miniature machines useful in four principal areas:

Standard machines, such as the grinder, and *building block com-*

ponents (bases, wings, slide units, boring heads) for custom layout of a complete production line for specific operations and conditions.

Special applications, such as a combination vertical grinding and boring machine, where exact prototypes are not readily viewable.

Exhibition machines for expositions. One set of 1/8 scale machines for transfer line layout is being shown at the International Machine Tool Exhibition in London.

Plant layout and exhibition layout models, 1/48 to 1/50 scale, helpful in setting up production lines for new plants, in modernization and work-flow analysis, in planning the most effective use of floor space at shows, and similar purposes.

The Abbott and Mackay models are built to scales ranging from 1/50 to 1/4, depending on the use to which they are put and the size of the actual unit. Sales demonstration models are usually no larger than 1/10 scale (to keep them portable). Models for exhibits and trade shows are larger (to permit easier viewing), those for plant layout much smaller and less complex.

The plastic and aluminum models are precision made and, Heald believes, a good investment because they:

- Open doors.
- Attract key people.
- Leave a lasting three-dimensional impression.
- Demonstrate the machines' versatility and mobility.
- Aid three-dimensional visualization.
- Bring up customers' questions.
- Extend interviews.
- Sell machines.

Industry Could Make 90% Of Sales in Five Areas

The furniture industry could service 90 per cent of its retail volume through five market areas, asserts John M. Snow, executive vice president, National Association of Furniture Manufacturers.

This study illustrates the need for many manufacturers of all types of products should re-examine their marketing alignment to obtain maximum profitability. That's the reason for increasing use of distribution cost analysis in metalworking.

5 Reasons Why Europe's Trade Blocs Will Unite

- **Markets of the six Common Market countries will become increasingly important to the United Kingdom.**
- **The U. S. wants a politically united Europe.**
- **Switzerland, Austria, and Sweden, all in the Outer Seven, are strongly dependent on Inner Six trade.**
- **Germany, in the Common Market, has a large volume of trade with the Outer Seven.**
- **The U. K. wishes to continue playing an important balance-of-power political role on the continent.**

ELIMINATION of custom barriers and free movement of trade between the Inner Six (European Common Market) and the British dominated Outer Seven (European Free Trade Association) will become a reality, predicts Ralph E. Smiley, president, Booz, Allen & Hamilton International Inc., management consultants. He cited five reasons (see exhibit above) for his forecast before the Second Annual Chicago World Marketing Conference last week.

Such an integration of trade will probably exclude an agreement in agriculture and common political ties between the two groups, believes Mr. Smiley. However, from an American businessman's point of view, he concludes that ultimate integration of the blocs is not of crucial importance. "Both the Outer Seven's 89 million inhabitants and the Inner Six's 168 million residents are large markets by any standards." He feels American business should "endeavor to develop both markets simultaneously" since together they are about 50 per cent larger than the U. S. domestic market and "each can support a separate operation by most American companies."

• Explains Opportunities — Mr. Smiley cites a twofold potential in European business: 1. The Common Market and EFTA are dynamic growth markets with excellent profit opportunities; 2. Participation directly within the trade bloc industries, with low labor costs and high output, opens up new opportunities in other world markets such as Latin America, the Middle East, Africa, and the U. S. itself.

Mr. Smiley calls for the adoption of a "world enterprise concept" by American businessmen to serve such markets. "The movement to large regional economic groupings is increasing evidence of the trend to plan for and invest in markets transcending national boundaries. To take full advantage of the full potential in Europe requires more than a piecemeal approach," he sustains.

He says the world enterprise approach involves integrated planning for both domestic and overseas markets, not merely extending domestic operations into overseas markets. Corporate structure, financing, plan of organization, operating policies, and management controls should all be examined to achieve an effective international organization, emphasizes Mr. Smiley.

The formation of two European trade organizations developed from disagreement on how an organization should be run. The Common Market has a complex political organization to direct and control movement to economic integration, while the EFTA is a loose union without the strong central authority of the ECM.

Concern Over Spot Unemployment . . . Distressed Area Legislation Coming . . . New Security Rules Adopted

Congressman Stratton seeks U.S. aid to up employment in his district

POLITICIANS are getting the jitters about the spot unemployment across the country as the November elections draw closer. For example, Rep. Samuel Stratton (D., N. Y.) is lighting a fire under several government agencies to bring more government contracts into his 32nd District. Last week, he wired the White House, Defense Department, Office of Civil & Defense Mobilization, and International Cooperation Administration, stating: The six-week shutdown at Alco Products Co. Inc., Schenectady, will throw 1000 more people out of work in an area already rated as a major unemployment area by the Labor Department.

● **HOW UNCLE SAM CAN HELP**—OCDM recently revised its policy to include what it calls "persistent" labor surplus areas. After they are classified by the Labor Department, all government agencies will give them some preference for contracts.

Current Defense Department policy is designed to help, but not alleviate, a community's economic ills. Defense sets aside some work for labor surplus areas and also allows two or more firms in such an area to bid jointly on work on a "tie-bid." The department also recognizes such areas when negotiated contracts are at stake. However, the department never accepts a higher bid from a firm in a labor surplus area than one from a nonlabor surplus area.

● **DISTRESSED AREAS LEGISLATION COMING**—Congressman Stratton is hopping mad at President Eisenhower's veto of the Democratic sponsored legislation to aid distressed areas. For one thing, he claims, it would have helped a community over the rough spots of technological change via loans. Ike objected to the Democratic bill because of its high cost. The administration's version was much smaller.

Although the Senate upheld Ike's veto by a 45 to 39 vote (11 short of the two-thirds majority needed to override a veto), situations like those of Representative Stratton indicate the strong probability of distressed areas legislation being passed next year.

Many congressmen feel that the channeling of government contracts is merely a stopgap procedure and want a solid program of long term loans to firms in a troubled community.

● **DEFENSE TRIES NEW SECURITY RULE**—Effective June 15, the Defense Department started a new method of classifying the secrecy of the defense-work which comes into your plant. The change is described as "fundamental" by Defense spokesmen because the new classification system puts the emphasis on certain information about the defense hardware which requires security, rather than on the hardware itself.

For example, previous procedure called for a whole project to be classified secret, and Defense admits, resulted in overclassifying much work. Thousands of dollars have been spent on plant guards, special fences, and other means of security to guard a project when only a small component needed the top secret stamp. Defense predicts much money will be saved.

Contractors will fill out a new version of Form 254 with their armed services contracting officers. The status of each item of information will be given. Defense claims it will be much easier for a contractor to decide how many guards he will need to hire and where he will have to set up secret work areas.

● **TOUGH TALK TO TRANSPORTATION**—John J. Allen Jr., Commerce Department under secretary for transportation, pulls no punches when he talks with transportation industry leaders. Recently, he warned a management group that the public is fed up with some of the infighting in the industry. He believes public policy in the future will modify Interstate Commerce Commission standards to allow increased competition among the various kinds of transportation, as well as speed up mergers among railroads. He believes the transportation industry should start now to assess its own future, rather than wait for the government to do the job.

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The creation of a Morgan Rolling Mill is a complex task requiring creative engineering skills of the highest caliber. The care and knowledge initiated at this point end in better production on your mill.

Seventy years of accumulated experience since Morgan developed the first continuous rolling mill in the United States in 1888 means Engineering which cannot be duplicated.

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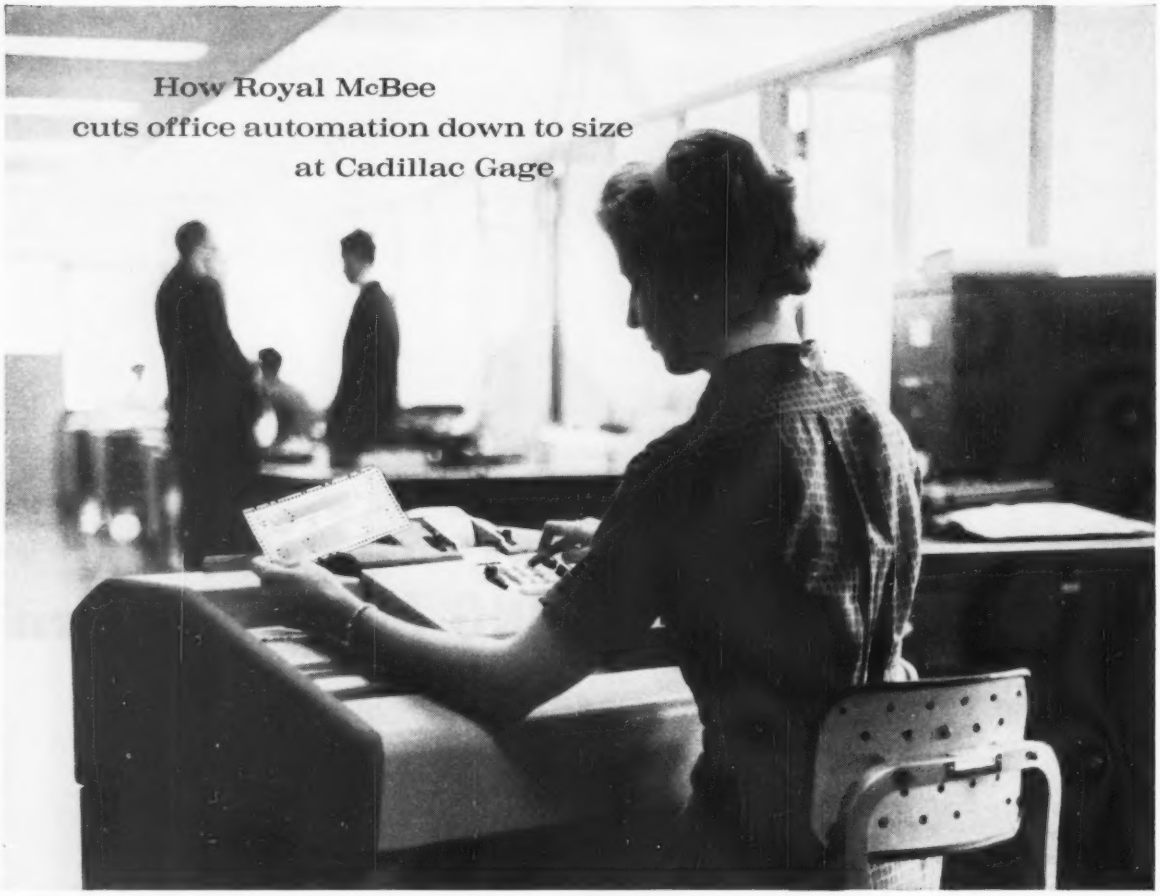
RM-74



Cadillac Gage gets tight production and labor control...reduces clerical costs by 30% with easy-to-use Automatic Keysort

NEED: fast, accurate management reports for controlling production of ultra-precision units—and a 475-man work force.

COMPANY: West Coast Division, Cadillac Gage, leading manufacturer of electric-hydraulic servo valve assemblies for missiles and aircraft.

SOLUTION: the easy-to-use, low-cost machines and punched cards of Automatic Keysort Data Processing.

METHOD: Keysort punched cards, mechanically code-notched with required information for rapid sorting, are created as original documents for 1) material planning, 2) job-routing and 3) labor distribution. Upon completion of each job, the accounting department automatically processes the collected information with the Keysort Tabulating Punch—internally coding the cards with actual and estimated time of job. This unique machine then automatically produces a tabulation of variance in work time by work center and order number.

RESULT: with the comprehensive, on-time reports made possible by Automatic Keysort, Cadillac Gage is now able to pinpoint any job in the plant . . . can determine the cost of labor and the total time spent on each job by department and individual clock number. Knowing where they stand, management can act *at once* to correct a profit-losing situation. Best of all, it's done without specialized personnel. Without restrictive procedures. And at remarkably low cost.

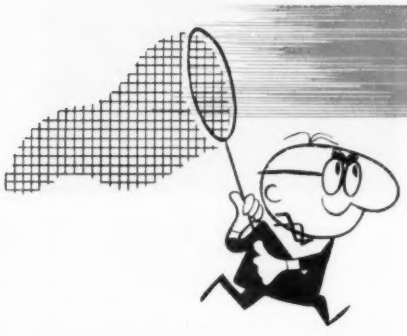
For a detailed report on Automatic Keysort Data Processing at Cadillac Gage, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, New York for Case History 977.

ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

MATERIALS EFFICIENCY

HOW TO GET IT



The consumer price index has jumped 18.1 per cent since 1950, and wages in the durable goods industries have climbed 35.9 per cent in the decade. The increase in imports and decrease in exports in steel alone from 1957 to 1959 amount to 7 million tons of finished products. Only greater efficiency can meet the triple threat of inflation, spiraling wages, and adverse trade trends. We discussed production efficiency in the first half of STEEL's 1960 Program for Management. In this and 12 succeeding articles, we'll explore materials efficiency.

METALWORKING'S biggest cost area—materials—is the least managed.

So charges Louis J. De Rose of the materials consulting firm, De Rose & Associates, New York. The challenge is accompanied by a promise of benefit:

"In better management of materials lies a largely untapped opportunity for better profits," says Andrew M. Kennedy Jr., vice president for purchasing and traffic at Westinghouse Electric Corp.

Materials open up many avenues to efficiency for two reasons:

1. On the average, they account for more than half your costs. (Most materials men define them as anything you buy or make, including components, to go into finished products.) About 55 per cent of industry's sales dollar is so spent. In some metalworking segments the ratio is even higher—its 60 to 65 per cent in autos and electronics.

2. Great technological changes are taking place, giving you unparalleled scope for changes in design, improved reliability, substitution, and many other techniques for cutting costs.

Take steel: "The steel industry will introduce at least twice as many new products in the next ten years as it did in any decade in its history," predicts Logan T. Johnston, president of Armco Steel Corp.

The new steels introduced so far have had marked effects. "The pattern of steel use is changing," Mr. Johnston says. "As each year passes, there is less accent on sheer tons. Fewer tons are doing more things and doing them better. We are tending to replace 100 tons of carbon steel with 90 tons of high tensile steel."

Improving technology is one of the reasons why metalworkers are able to operate with lower inventories than ever before. And that's a major cost saving because the average annual charge for carrying $100,000 in inventory is $15,000 to $25,000—15 to 25 per cent.

Market analysts believe we're witnessing an inventory revolution. Buyers are stocking less than ever before and pushing the warehousing function back to their suppliers.

The trend is good for the long term because:

1. It lowers inventory costs.

2. It levels out peaks and valleys in our business cycle, which itself

Purchasing Experts Sound Off on Materials Management

Vincent dePaul Goubeau
Vice President-Materials
Radio Corp. of America

"The objective of materials management is to improve the efficiency of acquiring, inventorying, and handling the materials that go into the products you make. One way to do this is to bring these functions together. The materials manager should know purchasing, inventory control, acquisition and stocking costs, and have a general understanding of manufacturing processes. He must be a human relations expert and broad gage enough to understand the over-all goals of the company. He should learn nearly as much about marketing as the marketing people, nearly as much about finance as financial men . . . and so on."

L. H. (Todd) Shippee
Director of Automotive Purchasing
American Motors Corp.

"The materials management function of the corporation should be dealt with in accord with the company's specific needs by evaluating the advantages in production scheduling, processing of materials, and economic savings. The company's size and volume of business often become factors in deciding whether materials management should be handled by a separate department or combined with the operations of several departments. Under present circumstances, American Motors considers this phase of its corporate business to be a co-operative function among production, planning, engineering, and purchasing departments."

William G. Blessing
Director of Purchases
Blaw-Knox Co.

"Materials management is good when you have a repetitive product. But it's not suitable for Blaw-Knox, which has 18 plants operating largely to customer specifications. When you can use materials management, it should start in engineering. To schedule engineering, you must know sales. When you have your engineering product requisitions, the purchasing department can order materials and expedite their delivery. When they arrive, you must schedule your tools to handle them—production's job. Then you have standards, time studies, manufacture, crating, and shipping. Here traffic takes over; it should be under purchasing."

would go far in saving expenses.

We embarked on an inventory binge in 1957. Although it generated a boom, it lead to the hangover of inventory liquidation and recession in 1958. This year the inventory buildup has been less than expected. We will benefit from the moderation next year, the analysts predict, because we won't suffer stock liquidation.

Where to Start

Warner McVicar, director of purchases and traffic for Rockwell Mfg. Co., is in the vanguard of metalworking executives urging that good purchasing management start with a written policy and procedure manual. Yet, 3 out of 4 purchasing departments have none. Less than 1 in 10 even has a written policy for internal use.

Still, a written policy is no panacea. "It is relatively easy for a company to have an outstanding purchasing policy—on paper," comments Thomas O. English, general purchasing agent for Aluminum Co. of America and past president of the National Association of Purchasing Agents. "But unless the people administering that policy have the skill, the ethics, and the determination to maintain it, an outstanding policy has little chance for survival."

For the rest of this and for 12 succeeding articles in the second half of 1960, STEEL will deal with the policy, skill, ethics, and determination needed to bring more and better management to materials.

How to Plan Materials

Materials planning can give you materials efficiency in several directions. But how to get the planning?

Many purchasing executives are answering with "materials management." It's the loudest buzz term to hit the purchasing profession since value analysis—and it has caused as much controversy. One

Frank J. DeCrane
Director of Purchases
Lamson & Sessions Co.

"We practice an informal kind of materials management, without calling it that. Our vice president for manufacturing co-ordinates the materials function, with several of us reporting to him on purchasing, production control, raw materials inventory, and other aspects of materials management. But each of us is in charge of his own area. In a company of our type (employing 2200 to make fasteners), it would be difficult for one man to be involved directly in all phases of materials. We consider scrap disposal as one of the materials management problems. At Lamson & Sessions, purchasing handles scrap sales."

Prof. Stanley H. Brewer
College of Business Administration
University of Washington

"Rhochrematics, the science of materials flow, is no more advanced today than scientific management of production was 50 years ago. But, in the next decade, materials management may surpass production management in the use of advanced managerial tools and scientific techniques; it may contribute more to cost reduction and customer service; it stands to make a tremendous contribution to business planning, control, and profitability. Top management interest, more than anything else, will release this potential. Management must concentrate more on this area since materials are a major part of costs."

reason is that the definition varies from person to person. Let's take the meaning given to it by Westinghouse's Mr. Kennedy who is chairman of a National Association of Purchasing Agents committee investigating the matter:

"Materials management represents one complete, undivided responsibility for providing the materials a company needs, in the right quantity and quality at the minimum cost, which cost should include transportation, inspection, storage, and delivery to point of use."

The last clause, "which cost should include transportation, inspection, storage, and delivery to point of use," makes materials management distinct from a straight procurement job. Some definitions go even further than this—the control of materials into, through, and out of the plant.

How do materials specialists feel about materials management? A sampling of the range of opinion can be seen from the five viewpoints on these pages. Consensus:

- The concept works best in the smaller and medium sized companies where executives have to wear several hats. The small firms, particularly, probably have been practicing materials management for years from necessity, although not calling it that.
- In larger organizations, the concept works best in companies that make high volume, repetitive products.
- Materials management requires an outstanding man to make it work. The bigger the company the more difficult it is to co-ordinate the whole materials function through one man. Often, the job may be broken down and parceled among several executives. But the co-ordination can be achieved by committee.
- Some proponents of materials management believe the concept should embrace production control, but most think it should stop short of that.

The idea of materials management is not new. It can be traced back as far as 1926. The aircraft companies were its strongest advocates during World War II. In the last two or three years it has enjoyed a new spurt in popularity. Cynics say purchasing agents are responsible . . . because they see a chance for added stature, responsibility, and salary via materials management. The more temperate view is expressed by E. F. Andrews, director of purchases at Allegheny Ludlum Steel Corp.

"Although I don't buy the full concept of materials management because it hasn't been proved to fit into all types of operations, I do think the co-ordination idea is a good one. Purchasing, manufacturing, and sales are all related, and there should be a link among them —either one man or a committee. For example, traffic in many companies fits well under purchasing. In steel today, well over 50 per cent of the traffic dollar is being spent by purchasing, but in industry generally, it's handled by purchasing in only 37 per cent of the cases. Raw materials inventory should be under purchasing's control; it is in about 9 of 10 cases."

The principal cause for the interest in materials management is the hope that it may help bring order to what has approached chaos at times. The purchasing fraternity is hunting for means to cope with the flood of technological advances, the growing complexity of our economy, and the powerful demand for lower costs.

Materials management tries to reunite the functional areas relat-

MATERIALS EFFICIENCY

HOW TO GET IT

'HELP WANTED' Ads Like This Become Common as Industry Seeks Men Qualified to Manage Materials . . .

TOP LEVEL EXECUTIVE POSITION

The gentleman we seek will be responsible for planning and executing the purchase of many millions of dollars worth of materials and services.

He will report to, and be directly responsible to, the general manager.

The salary of this position, which includes incentive compensation opportunities, will be commensurate with top executive compensation for such positions.

He will be a member of the general manager's staff, participating directly in executive level decisions.

He will not be a replacement: This is a newly created position at the head of an operation of 300 people.

As Manager of Materials his duties will include the planning, control, and execution of procurement policies and procedures, personal contact with top executives of large corporations, and the negotiation of contracts with those corporations.

Combined with his technical competence and experience, he must have superior business acumen, indicated by at least five years of accomplishments as director of purchasing or subcontracting with a multimillion dollar company. His experience in this field should also include several years in manufacturing or industrial engineering management.

ing to materials that have become separated. The extremists say the manager must be a specialist in techniques to integrate the disciplines of buying, engineering, traffic, and production control. They say materials management determines how investment in working capital should be distributed—in work in process, in inventory, in products in transit, in the amount to be spent with outside venders.

The majority among students of the subject say that the man who does all that should be the president of the company. Westinghouse's Mr. Kennedy expresses the view of the majority checked by STEEL. He thinks that materials management means control of materials through inventories but stops at the point of production control and shop fabrication. He doesn't even believe that inventory control is absolutely essential to the concept.

"It all depends on the ability and the capacity of the man involved," he says. He believes you can have excellent materials management just by working in materials areas where the greatest leverage for profit exists.

Selecting the point of leverage is important. Is it inventories? Consider this case:

Assume you have $100 million worth of materials in stock, a three months' supply. Suppose you can reduce that to a two months' supply (an extreme case; the usual reduction is in the order of 1 per cent or less). But under this supposition, you have saved $34 million in tied-up assets. A company doing that much business would have to have annual billings of about $2 billion, of which $1 billion would be spent on materials. The reduced inventory of $34 million could earn only 10 per cent at best, or $3.4 million. So, the inventory reduction route saves you $3.4 million a year.

But Mr. Kennedy suggests: "The potential in the $1 billion worth of purchases themselves should be 10 to 20 times the potential of inventory cost savings. The real question is: Can a purchasing organization really work both fields effectively? The greater priority lies in the field of greater opportunity. It's rarely desirable to make any sacrifice of effectiveness in the cost reduction effort to attack the expense reduction possibilities in inventories.

"At Westinghouse, the province of purchasing is materials. It embraces materials utilization, conservation, substitution, development, and research by suppliers. The creative purchasing job is to work in this area to reduce the cost of the manufactured product. This is not exclusive to purchasing. The responsibility is a joint one, shared with engineering and manufacturing personnel devoted to the same objectives. The most successful buying organizations are those which are fully integrated with engineering and manufacturing in product design, redesign, and development. Purchasing is a necessary partner in the triumvirate if the best abilities of suppliers are to be effectively brought to bear on the materials problems of the company and the tremendous potential for product improvement and cost reduction which exists."

An example of what materials design can do: In 18 months, Westinghouse went from gray iron to aluminum to magnesium in an end bell for small motors. The magnesium permits three diecastings to be made in the time it takes to make two from aluminum. Several of the next 12 articles in this series will show how materials design and engineering can help you.

Materials Management Works

More and better management of materials can solve many of your problems. You don't have to go all the way with the concept. Be governed by the size and kind of company you have and by the people available for the job. And concentrate on the areas — inventories, technology, or what have you— where you get the greatest leverage on profits.

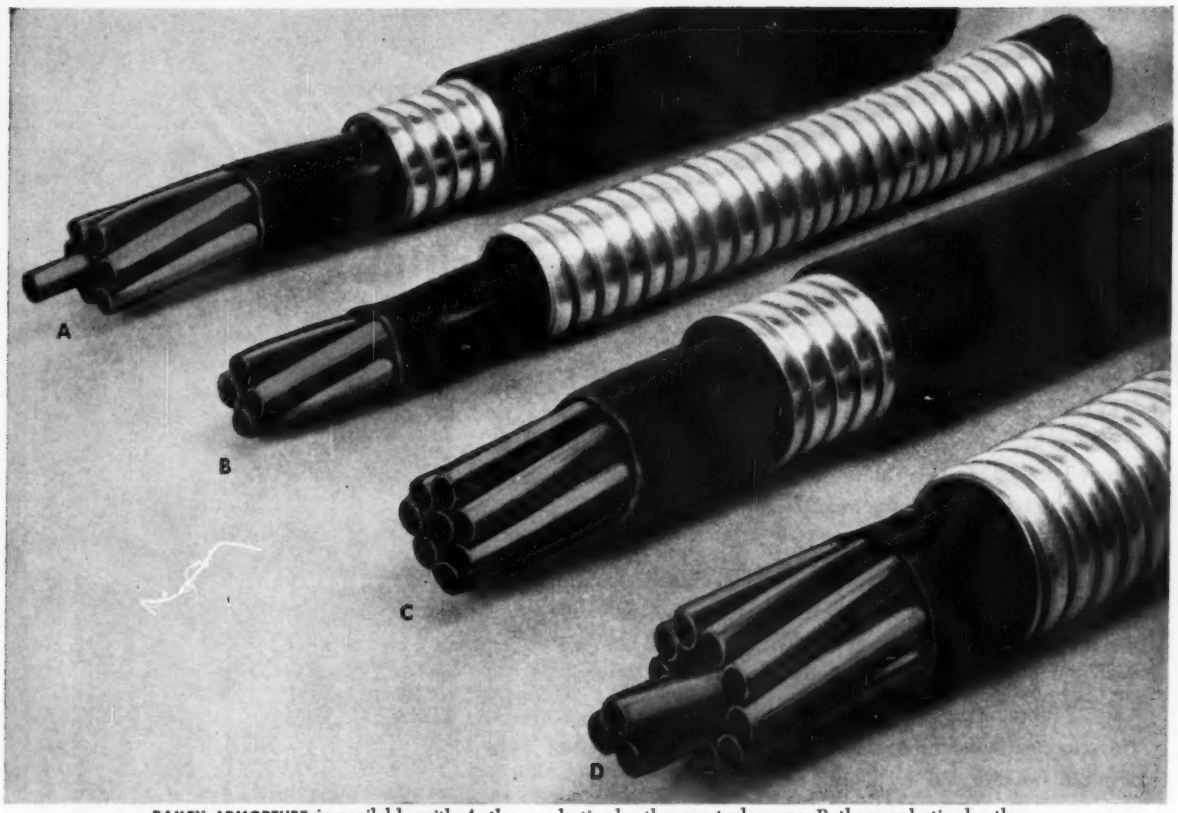
The benefits of a materials management tailored to your needs:

- Reduced manpower.
- Shorter leadtimes.
- Better supplier-user relations.
- Greater flexibility, particularly for larger firms.
- Better competitive position.
- Lower costs.

Materials Efficiency

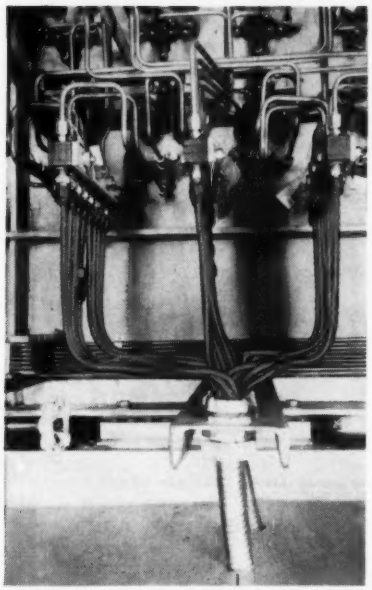
How to Buy Creatively

That's the article coming up July 18 in STEEL's 1960 Management series. For a free copy of any or all articles in this 13 part program on materials efficiency (which started July 4 and will run every other week for the rest of the year), write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Also available on the same basis is the companion series on production efficiency which appeared during the first half. Use of material like this may win you $1000. For details, see Pages 5 and 6.



BAILEY ARMORTUBE is available with *A*, thermoplastic sheath over steel armor; *B*, thermoplastic sheath under steel armor; *C*, thermoplastic sheath over and under steel armor; or *D*, with just steel armor.

For its "Armortube" control system cables, Bailey specifies Anaconda precision copper tube in long coils



A TYPICAL INSTALLATION of Bailey Armortube in a large utility, indicating the large number of separate lines carried by two easily installed cables.

Armortube® flexible, armored, multiple-tube cable made by Bailey Meter Company, Cleveland, Ohio, has saved up to 40% of single-tube installation and maintenance costs in pneumatic, metering and control systems.

Armortube cable is available in lengths up to 1000 feet and in bundles of up to 19 individual ¼" O.D. copper tubes. Steel interlocking armor protects the tubes from mechanical damage and simplifies installation. In addition, various combinations of thermoplastic sheathing are available to provide further protection from moisture and corrosive atmospheres during and after installation.

CLEAN AND DRY. The copper tubes must meet rigid quality specifications, and Bailey has found that Anaconda copper tube consistently meets its requirements. Anaconda takes special care to see that inside surfaces are clean, smooth, and bright—free from dust, dirt, or metal chips which might interfere with the operation of delicate air and hydraulic circuits. Tube ends are sealed to keep out moisture and foreign matter during storage.

FLEXIBLE AND ACCURATE. Anaconda copper tubes are uniformly soft, highly flexible—for easy bending during installation. And they are accurate in size and shape.

LONG LENGTHS. For applications such as instrumentation, Anaconda can produce copper tubing in coils up to 2200 feet for ¼" O.D.—up to 1400 feet for ⅜" O.D.—up to 1000 feet for ½" O.D.

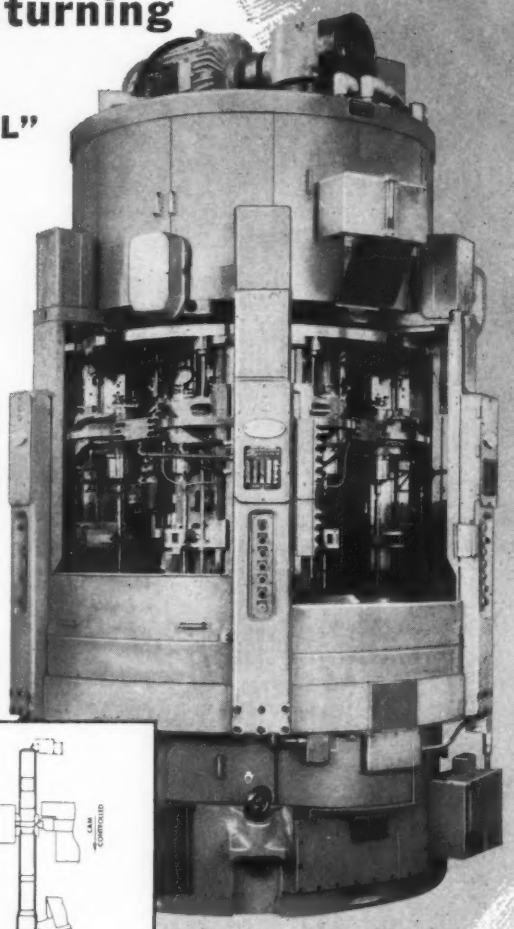
QUALITY TUBE AND CREATIVE TECHNICAL SERVICES. Whatever your requirements for precision copper tubing—instrumentation or capillary tubing, or restrictor tubes—Anaconda specialists can help you find the most economical way to do the job. For such technical assistance, see your American Brass representative, or write: French Small Tube Division, The American Brass Company, Box 1031, Waterbury 20, Conn. 6069

ANACONDA®
INSTRUMENTATION TUBING

Productivity

with a BULLARD center turning

MULT-AU-MATIC TYPE "L"

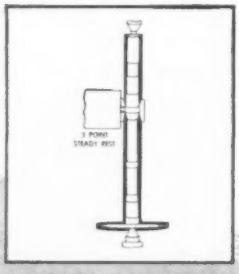


Over the years, many improvements in design and engineering have been incorporated – until today – the Bullard Center Turning Mult-Au-Matic, Type "L" is built to produce for your highest productivity and efficiency.

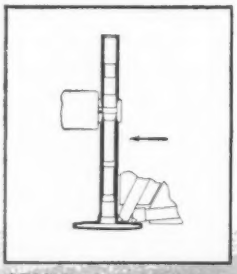
This machine is available with 6 or 8 spindles, single or double index, with either 10" or 14" diameter chucks. Spindle speeds of 56 to 1250 R.P.M. can be furnished and individually selected for each working station. Feed rates, between .0025 and .0625, can be individually selected for each working station.

Thus, to insure maximum productivity of the machine, you have individually selected spindle speeds and tool feed rates at each station. Further, it permits the use of modern cutting tools, methods and materials which also contribute to reducing your machining costs.

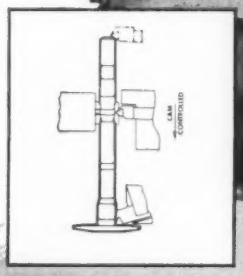
Prior to the Bullard operation, pieces have been center drilled at both ends and steady rest spot ground to support the shaft during turning cuts.



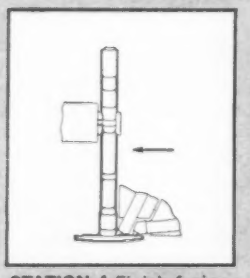
STATION 1 Loading and unloading.



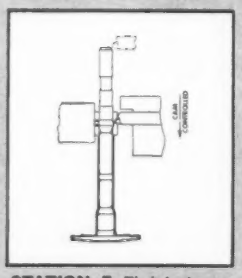
STATION 2 Rough facing of flange.



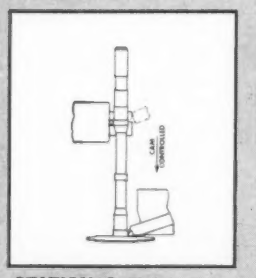
STATION 3 Rough turning of stem diameter — full length of shaft.



STATION 4 Finish facing of flange.



STATION 5 Finish turning of stem diameter — upper part of shaft.



STATION 6 Finish turning of stem diameter — lower part of shaft.

HOURLY PRODUCTION . . . 105 PIECES AT 100% EFFICIENCY

We invite you to investigate the

"Mult-Au-Matic Method"

to increase your productivity and reduce your costs.

The Bullard Company
Bridgeport 9, Conn.

MIRRORS OF MOTORDOM

More auto sales mean more metal usage. But compact cars decrease average weight per vehicle. Aluminum and zinc usage still on uptrend. Compact designs mean longer runs for parts.

Compacts Reroute Auto Marketing

ONCE UPON A TIME there were three price classes of cars—low, medium, and high. They split up the market 60:35:5. The industry was geared to a three year tooling cycle with facelifts in between. Social stature in the old home town depended on whether you could upgrade yourself from a Chevrolet to a Buick.

Postwar buyers wanted frills and thrills. Horsepower climbed. Cars grew longer and more luxurious. Power gadgets were introduced. Labor and material costs went up. So did car prices.

Then came the revolution. Automobiles began to look too much alike and cost too much. Long term credit supplied the short term answer. But consumers had started an unconscious rebellion. The market analysts call it diversified demand for spendable income. They meant that Joe Autophile now wanted a ranch house, a swimming pool, a trip to Europe, and a mink for the wife. Easy credit wasn't enough. Joe started looking around for less expensive transportation that was different enough to be stylish. His kid brother bought a sports car, but payments on the ranch house and the mink were so high Joe couldn't afford one. Then an old Army buddy told him about Volkswagen. Joe bought. So did his neighbor. So did 74,000 others. The import trickle became a flood.

After 1958's recession, economy and compactness were virtually synonymous with stylishness. Big Three builders introduced their own compacts to meet the demand and to catch up with Rambler.

What 100,000 Car Sales Mean to You

Product	Million Pounds 1962*	1960	1958
Steel stampings	151.2	158.8	165.2
Aluminum stampings	2.4	2.2	2.0
Steel forgings	7.2	7.5	7.8
Gray iron castings	40.0	42.7	46.7
Malleable castings	4.8	5.0	5.2
Aluminum castings	7.5	6.2	4.6
Zinc diecastings	4.8	4.7	4.9
Electrical wire	1.8	1.9	2.0
Wire products	5.4	5.6	5.9
Misc. metal products	75.0	79.1	82.3

Based on average metal weight per car. Adapted from Ford Motor Co. data. Does not include scrap.
*Projected on current trend basis.

Market's More Segmented

The compact craze has brought about a change in traditional marketing patterns. The industry now has four basic price groups—five if you count imports separately. More brandnames are available. Price differences have narrowed, and competition is keener. Generally speaking, compacts are taking a quarter of the market. The low priced standard lines are accounting for 50 per cent. Medium makes have slipped to 20 per cent. Luxury lines are holding fairly even.

Several of the marketers STEEL interviewed say they doubt that the

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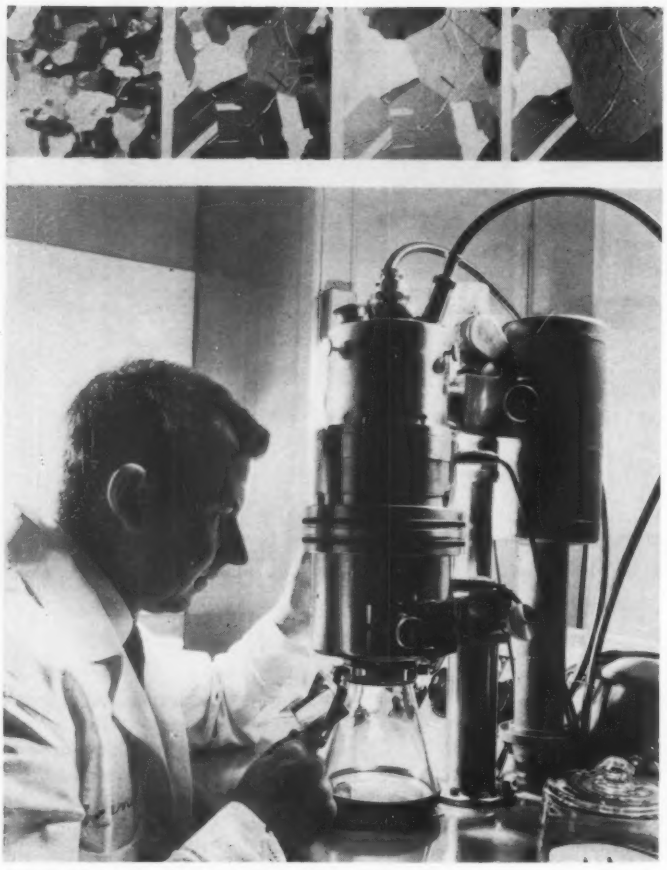


THERMIONIC EMISSION ELECTRON MICROSCOPE is used by the physics department of General Motors research laboratories. It offers a continuous view of what happens to the structure of metal as it's exposed to higher temperatures. The sample of SAE 1080 steel (above) has been magnified 3000 times to show the microstructural changes occurring as temperatures rise from 1800 (left) to 1950° F

three-way market split will ever return. They claim buyers' needs have become too diversified and too refined. Don Peterson, Ford's car planning manager, has already promoted the segmented market concept: Cars are classified and sold on the basis of nine different functions they can perform (STEEL, Dec. 21, 1959, p. 68). An economist for another of the Big Three agrees that the theory holds true for sports cars, station wagons, and runabouts, but he advances another which he claims can be applied sooner. He thinks the market will be divided into seven basic size and price groups by 1965.

"Imports and small cars like the one Ford reportedly is planning will account for perhaps 10 per cent of all sales," he says. Falcon, Corvair, and Valiant will share another 20 per cent. Five models in the Comet class will account for 30 per cent of the market. They include the forthcoming Buick-Oldsmobile-Pontiac compacts and the Dodge Lancer. Today's standard sized cars (Plymouth, Ford, Chevrolet, and Dart) will be reduced to a single series each, made up of wagon and sedan models. They'll take 15 per cent of the market. Another 20 per cent will go to single series of five medium priced makes—Mercury, Chrysler, Pontiac, Oldsmobile, and Buick. Half a dozen other models will split up the remaining 5 per cent. They'll be divided into two types of luxury cars: One group will be the three standard lines—Cadillac, Lincoln, Imperial. The other will be compact sports type luxury cars like T-Bird. General Motors will have one. So will Chrysler—it may be a De Soto.

Big Cars Get Smaller

Ten lines (probably more) instead of three will be competing for the lower 60 per cent of the market. They'll all have less than 115 in. wheelbases—meaning that Detroit believes buyers will continue to prefer compact cars. Even the people involved with bigger automobiles are taking heed and by 1963, most of the standard sized cars will be at least 3 in. shorter, 2 in. narrower. Several will be an inch or two higher.

The luxury lines are planning for "compact" models too (STEEL, Mar. 21, p. 109).

What's Ahead for Metalmen?

For metalworking, the changes mean that average per car weight will decrease as compacts take over a larger share of the market. (See chart on Page 51).

Average use of metal per car was 3265 lb in 1958. This year the figure is down to an estimated 3140 lb. By 1962, it should be around 3000 lb. But remember: While metal consumption per car may go down, the number of cars produced will climb during the '60s. Actually, more parts will be produced and more material consumed by the auto industry.

U. S. Auto Output

Passenger Only	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
5 Mo. Totals	3,196,431	2,726,017
June		557,995
July		555,410
August		239,149
September		258,151
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
May 28	142,359	117,372
June 4	115,068	125,186
June 11	139,423	127,029
June 18	137,641	129,270
June 25	140,319†	127,217
July 2	138,000*	108,397

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

This coil-fed Wean "Flying Press" line performs both shearing and blanking operations.

Massey-Ferguson saves up to $9 per ton on material costs with Wean coil processing lines

As a measure of its products' popularity, Massey-Ferguson, Ltd. of Toronto cites the fact that M-F combine and baler production fills every available Canadian railroad flat car twice a year.

Five years ago, Massey-Ferguson's production and purchasing personnel made a thorough cost study of their extensive steel demands, then being provided by shearing from purchased sheets. As a result, three Wean coil processing lines were installed to supply these requirements directly from standard coil.

The three Wean lines are: (1) an edge-trim and cut-to-length line, with a flying shear; (2) a Wean slitting line; and (3) a Wean "Flying Press" line that offers the versatility of straight or angle shearing or blanking of coil stock, all in one machine.

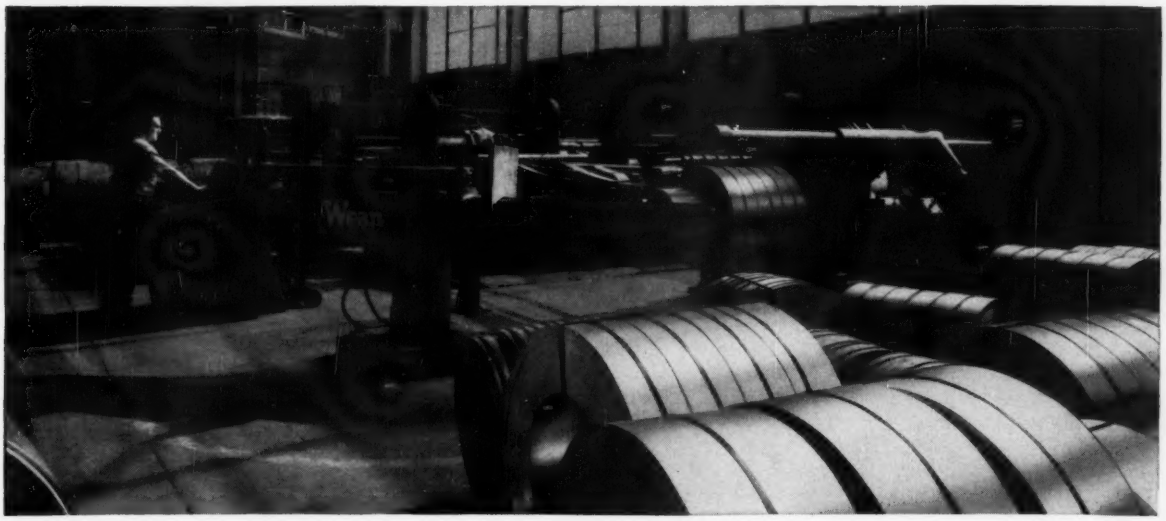
Massey-Ferguson management credits this coil processing system with savings of from $4-9 per ton of metal consumed. And besides the direct production savings in sheet supply, the threat of model-change obsolescence is removed when steel inventory is in coil form.

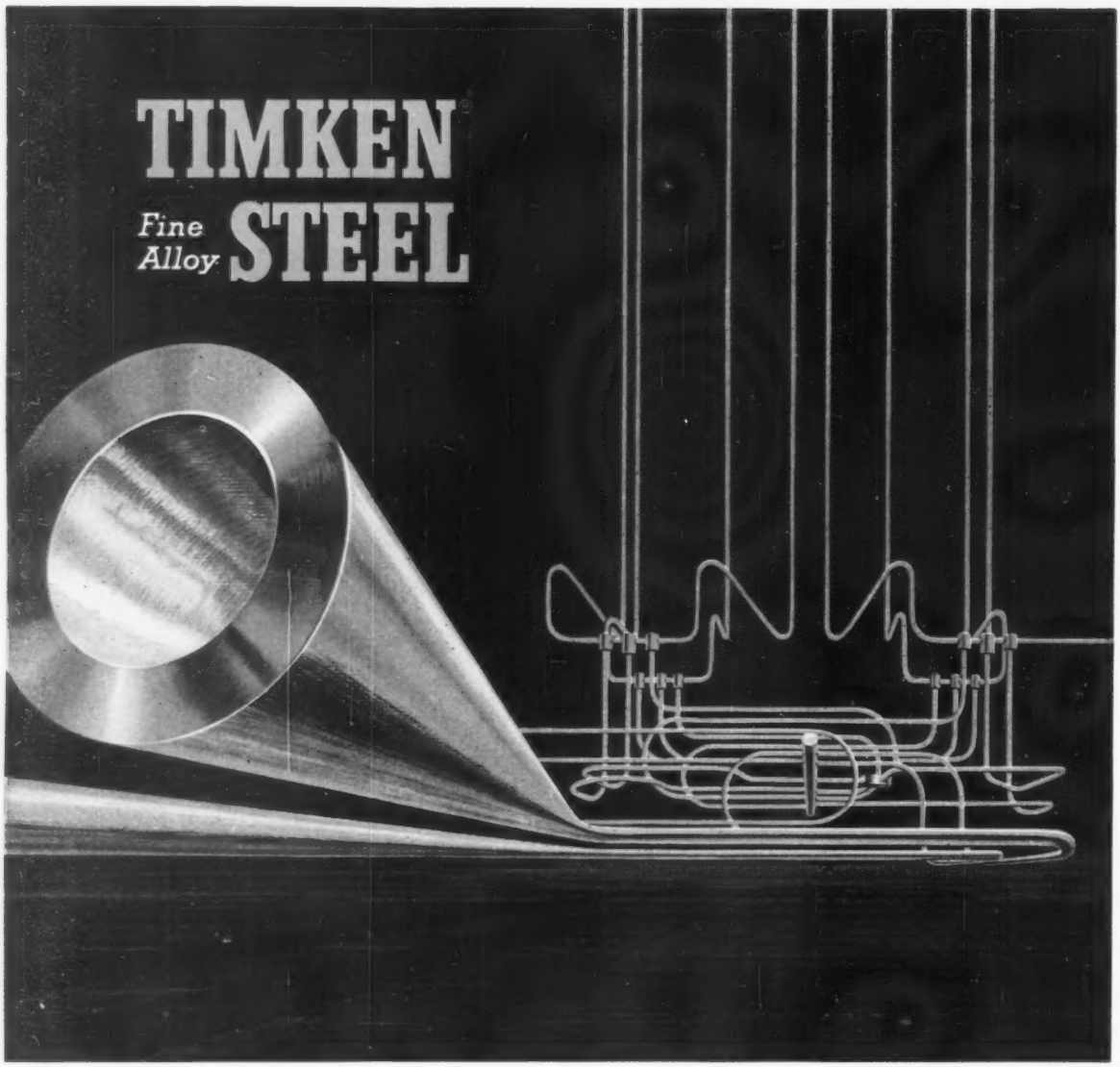
Many metalworking firms have had similar experience in the profit-making aspects of coil processing equipment. The concept and economics of coil processing are discussed in a new brochure available from Wean. Write for your copy of this informative catalog.

WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard
CLEVELAND 17, OHIO

WEAN

Standard coils are slit to a wide variety of widths on this Wean line at the Toronto M-F plant.





Watts cooking

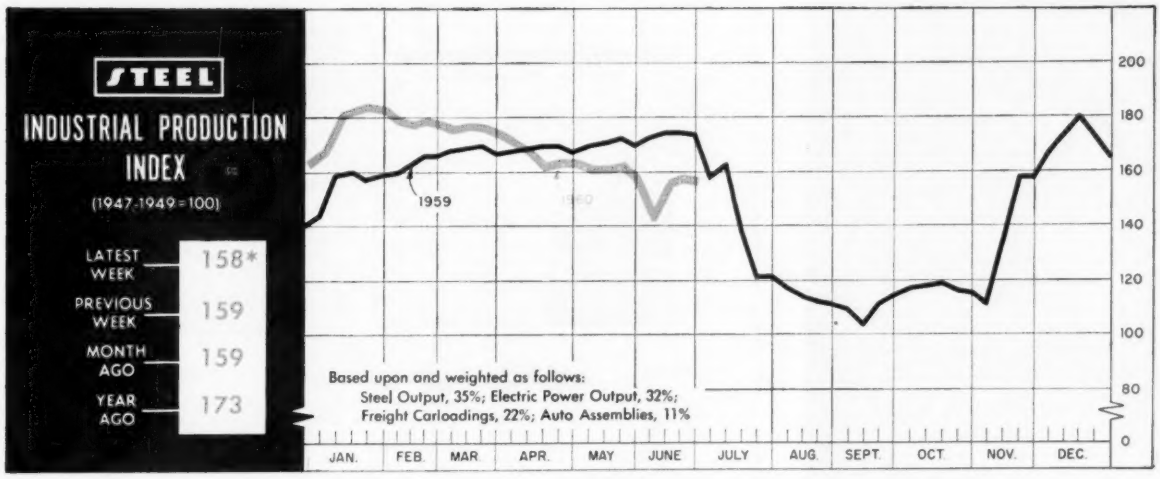
Here's how they're cooking watts and keeping light bills down for customers of The Cleveland Electric Illuminating Company. In a new 250,000 Kw steam station at Avon Lake, Ohio, they put extreme pressures and temperatures to work to get more energy from each lump of coal. It's only the third power plant in the United States to crack the critical pressure barrier.

To transfer the red-hot 100 m.p.h. blast of steam from boiler to turbine with ordinary carbon steel would require piping of fantastic dimensions —with walls three feet thick—and from the top of the furnace down to the turbine it's a seven-story drop. The problem called for seamless tubing that was strong and tough—a super stainless steel.

The piping contractor for the new plant, The Pittsburgh Piping & Equipment Co. asked the Timken Company to produce AISI type 316 main steam piping for this extremely rugged high temperature, high pressure service.

Timken Company metallurgists specified a carefully balanced alloy content, made in the most modern electric melting furnaces. That's the key to producing pierceable super alloys. The result was stainless steel tubing with wall thickness light enough to permit a much lower cost. As for strength, the high alloy content of this steel should enable the tubing to carry red-hot steam 24 hours a day —for 40 years!

Whether your steel problem is size, weight, pressure, temperature, oxidation, or all of these things (as this problem was), call in Timken Company metallurgists! Their 40 years of experience in making fine alloy steel will give you a fast, low-cost solution. ***When you buy Timken steel you get . . .*** *1) Quality that's uniform from heat to heat, bar to bar, order to order; 2) Service from the experts in specialty steels; 3) Over 40 years experience in solving tough steel problems.* The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*



*Week ended June 25.

Prices to Hold in Second Half

IF YOU are searching for an example where early year prognostications match midyear facts, take a look at prices. Everybody said this would be a year of stability; so it has been, and so it should continue to be.

• **Evidence** — Take the government's price indexes. So far this year, wholesale prices have advanced less than 0.4 per cent—from 119.3 to 119.7 (1947-49=100). By the end of the year, most experts are anticipating a top level of 120. Practically all the movement in the last year has been in farm and food products. Industrial prices in May (the latest data) were no higher than they were in January and only fractionally higher than a year ago. And 6100 metalworking managers queried by STEEL say they won't be significantly higher by Dec. 31. (See June 27, pp. 43-46.)

For the consumer price index, the uptrend has not been completely halted, but the momentum has been reduced. Since January, the cost of living has advanced only three-fourths of 1 per cent, and less than 1.9 per cent in the last 12 months. By the end of the year, the index may reach 127 per cent of the 1947-49 base, equal to an advance of about 1.5 per cent for the year.

• **No Phony Gains**—The record indicates that gains in the economy during 1960 (see Pages 25-26) will be bona fide. There will be little, if any, inflation in the record ($507 billion) gross national product. Personal income, which will probably average better than $400 billion in 1960, will buy more goods. The anticipated increase in corporate profits will mean more in purchasing power, encouraging businessmen to continue their capital expenditure programs.

Price stability means fewer cost-of-living raises to workers who have escalator clauses in their wage contracts—a factor many observers feel has contributed to the inflationary

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,560[1]	1,739	2,215
Electric Power Distributed (million kw-hr)	14,100[1]	14,053	13,749
Bituminous Coal Output (1000 tons)	8,905[1]	8,725	9.359
Crude Oil Production (daily avg—1000 bbl)	6,800[1]	6,840	7,025
Construction Volume (*ENR*—millions)	$485.1	$583.2	$502.6
Auto, Truck Output, U. S., Canada (*Ward's*)	175,880[1]	173,574	164,608
TRADE			
Freight Carloadings (1000 Cars)	640[1]	650	698
Intercity Truck Tonnage (changes from year ago)	−5.8%	−3.1%	+13.1%
Business Failures (Dun & Bradstreet)	353	283	267
Currency in Circulation (millions)[3]	$31,927	$31,976	$31,807
Dept. Store Sales (changes from year ago)[3]	+3%	+2%	+22%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$30,620	$26,486	$25,868
Federal Gross Debt (billions)	$288.9	$289.2	$284.6
Bond Volume, NYSE (millions)	$27.6	$25.1	$26.4
Stocks Sales, NYSE (thousands of shares)	18,280	17,701	14 772
Loans and Investments (billions)[4]	$104.2	$102.6	$103.1
U. S. Govt. Obligations Held (billions)[4]	$25.8	$25.6	$30.6
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247 82	247.82
STEEL's Nonferrous Metal Price Index[6]	231 9	231.8	221.8
All Commodities[7]	119.5	119.6	119.6
Commodities Other than Farm & Foods[7]	128.3	128.3	127.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

WARD STEEL CO.

We specialize in
FINISHED STEEL
BARS—TUBES—STRIP

PROMPT WAREHOUSE SERVICE ONLY

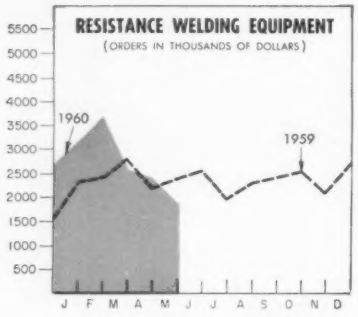
Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

87A Rindge Ave. Ext. Phone UN 4-2460
CAMBRIDGE 40, MASS.

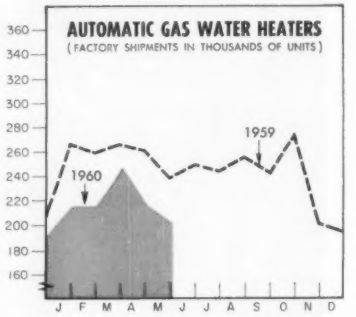
Branch:
3042-3058 W. 51st Street, CHICAGO, ILL.
Phone: Grovehill 6-2600

THE BUSINESS TREND



	Net Orders 1960	Net Orders 1959	Shipments 1960	Shipments 1959
Jan.	3,258	2,396	1,582	1,427
Feb.	3,732	2,457	2,563	1,889
Mar.	2,653	2,811	3,011	2,179
Apr.	2,446	2,258	2,943	2,193
May	1,871	2,407	2,310	2,019
June	....	2,597	....	2,702
July	....	1,980	....	2,269
Aug.	....	2,322	....	2,928
Sept.	....	2,435	....	2,113
Oct.	....	2,599	....	2,097
Nov.	....	2,131	....	1,597
Dec.	....	2,768	....	2,353
Totals	....	29,161	....	25,766

Resistance Welder Manufacturers' Assn.
Charts copyright, 1960, STEEL.



	Shipments—Units 1960	1959	1958
Jan.	215,500	266,200	235,400
Feb.	215,200	259,700	216,300
Mar.	247,300	265,900	221,600
Apr.	216,600	261,300	221,900
May	201,700*	239,300	210,000
June	.....	250,000	231,000
July	.....	245,100	221,400
Aug.	.....	256,000	215,500
Sept.	.....	243,800	230,000
Oct.	.....	274,200	265,900
Nov.	.....	199,100	197,100
Dec.	.....	192,900	207,300
Totals	.....	2,953,500	2,673,400

*Preliminary.
Gas Appliance Mfrs. Assn.

spiral in the U. S. in the past.

• **Loophole**—Despite the near unanimity among analysts about the price situation, their forecasts could still miss the mark. Many wage contracts will be negotiated this year, and one sure bet is that workers aren't going to get cut back. Associated Industries of Cleveland reports that the basic wage negotiated in the bellwether Northeastern Ohio area so far this year averages 7 cents an hour. Greater productivity may partially offset the increases but only partially.

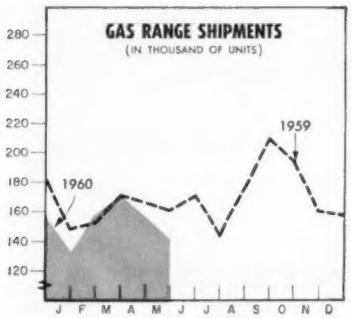
In the fall, new autos will carry higher price tags than they do now. Some observers believe that the compact cars will tend to check the seasonal trend this year. Others point out that compacts have been with us for a year and that their influence on the price structure won't be great.

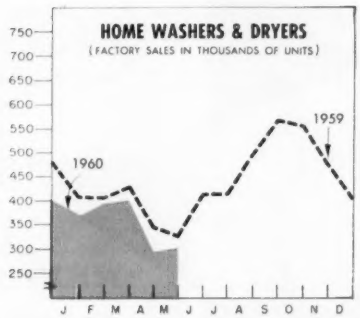
But the steel industry is the biggest question mark of all. The first installment of its direct wage increase under the new agreement is due on Dec. 1. Earlier this year, it was a common assumption that prices would go up soon after. Now, observers are not so certain. The need for an increase will be as great as ever, but unless the market is strong, many say a price hike may not stick. But if it does, it will be passed all along the line, knocking the props from under the stability banner.

Plateau to Move into 1961

Relative stability on a high plateau into the first half of 1961—that's what Prentice-Hall Inc., Englewood Cliffs, N. J., expects of the economy. "The 'no boom, no slump' trend which has characterized the economy since the first quarter of this year is expected to last 15 to 18 months."

P-H admits that most forward indicators do not justify this reserved optimism, but there are several factors which will support the plateau. First, the inventory cutbacks in metalworking will soon be over, and output of basic metals will respond in the fall and winter. Second, Soviet-Chinese saber rattling will probably influence defense spending this summer. Third, consumer incomes—and presumably spending—will continue in an uptrend throughout the year. (To quote one economist: "Give the consumer more money, and he'll spend it. He always has and probably always will.")





	Shipments—Units		
	1960	1959	1958
Jan.	133,500	148,700	128,200
Feb.	158,600	152,400	134,200
Mar.	171,900	171,200	149,300
Apr.	156,400	165,800	148,200
May	142,700*	160,300	147,200
June	.....	170,900	155,900
July	.....	143,700	129,100
Aug.	.....	176,100	157,700
Sept.	.....	210,300	182,300
Oct.	.....	194,500	212,200
Nov.	.....	159,600	171,200
Dec.	.....	156,900	181,000
Totals	.....	2,010,500	1,896,500

*Preliminary.
Gas Appliance Mfrs. Assn.

	Washers		Dryers	
	1960	1959	1960	1959
Jan.	254,565	288,491	111,603	118,220
Feb.	283,640	297,826	108,367	106,274
Mar.	305,635	329,668	90,205	98,434
Apr.	235,828	274,372	53,213	67,752
May	243,943	277,934	53,700	45,903
June	.....	341,894	.....	70,838
July	.....	318,063	.....	95,248
Aug.	.....	359,849	.....	133,197
Sept.	.....	394,112	.....	174,560
Oct.	.....	374,135	.....	179,669
Nov.	.....	312,796	.....	157,047
Dec.	.....	264,236	.....	134,633
Totals	.....	3,833,376	.....	1,381,775

American Home Laundry Mfrs. Assn.

Other bullish factors: An anticipated uptrend in construction, especially housing, as money eases; gradually increasing exports.

Index Sets for Plunge

STEEL's industrial production index held up pretty well in June following the Memorial Day dip, but look for the trend line to take one of the biggest drops for any nonstrike period on record starting with the week ended July 2. It will hit bottom in the following week (containing the holiday itself), but there will not be the usual bounce to preholiday levels immediately following.

The big reason is the depressed state of the steel industry. Many plants started shutdown operations late last week, cutting the national rate to just under 55 per cent of capacity. Some have shut down indefinitely, while others will take a prolonged holiday. It would not be surprising to see the operating rate fall through the 40 per cent level during the week ended July 10.

The auto industry also is expected to reach its lowest level so far this year. The elimination of Saturday work over the long weekend started the decline, and some plants are likely to remain closed a large part of this week to adjust inventories. It is doubtful that assembly rates will climb back to the preholiday level until well into the new model run because several plants are scheduled to run out the 1960 lines this week.

Along with the usual holiday declines in output of electricity and railroad freight carloadings, the cutbacks could run STEEL's index trend line down to the 130 range (1947-49 = 100) during the week ended July 9.

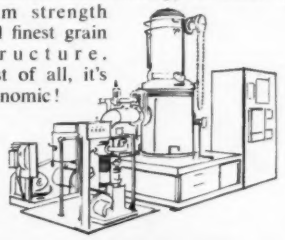
Trends Fore and Aft

- The Federal Reserve Bank of Cleveland feels that both consumer and business investment in the third and fourth quarters will be moving forward. Business investment is expected to break the record of $67 billion (annual rate) set in last year's second quarter.
- Bank clearings rose to a record $30.6 billion in the week ended June 22, reports Dun & Bradstreet Inc.
- Business incorporations in May totaled 15,530 firms, slightly above the May figure but well under the year-ago total, says D&B.

HERBERT W. WESTEREN, Assistant Director of Hayes Research and Development Group, tells about the . . .

"VACUUM AGE" OF HEAT TREATING

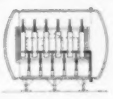
A major New York manufacturer of aircraft equipment recently reported their Hayes Vacu-Master Cold Wall Furnace was paying off in many ways — providing rapid cycling, simplified work handling, and complete production flexibility. Additionally, the vacuum furnace has eliminated need for atmosphere equipment . . . and produced work (stainless steel brazing) of maximum strength and finest grain structure. Best of all, it's economic!



Similar Success Stories come to us from other users of Hayes Furnaces. Successful heat treating of "exotic" metals (tantalum, titanium, niobium, etc.) in the 2600 to 4500°F range. Successful sintering, hardening, annealing, and degassing at high production rates. Success stories all around!

The "Universal Atmosphere" has Universal Applications

Unlike other "atmospheres," vacuum has virtually no job limitations. Here's where the ingenuity of Hayes development engineers comes into play. By coordinating furnace design with job requirements . . . and by PROVING RESULTS in the Hayes lab . . . Hayes vacuum furnace engineers assure the customer a "RESULTS GUARANTEED" installation every time. I'd like to invite you to advance your heating into the "vacuum age" . . . with HAYES!



Write for vacuum Bulletin 5709A.

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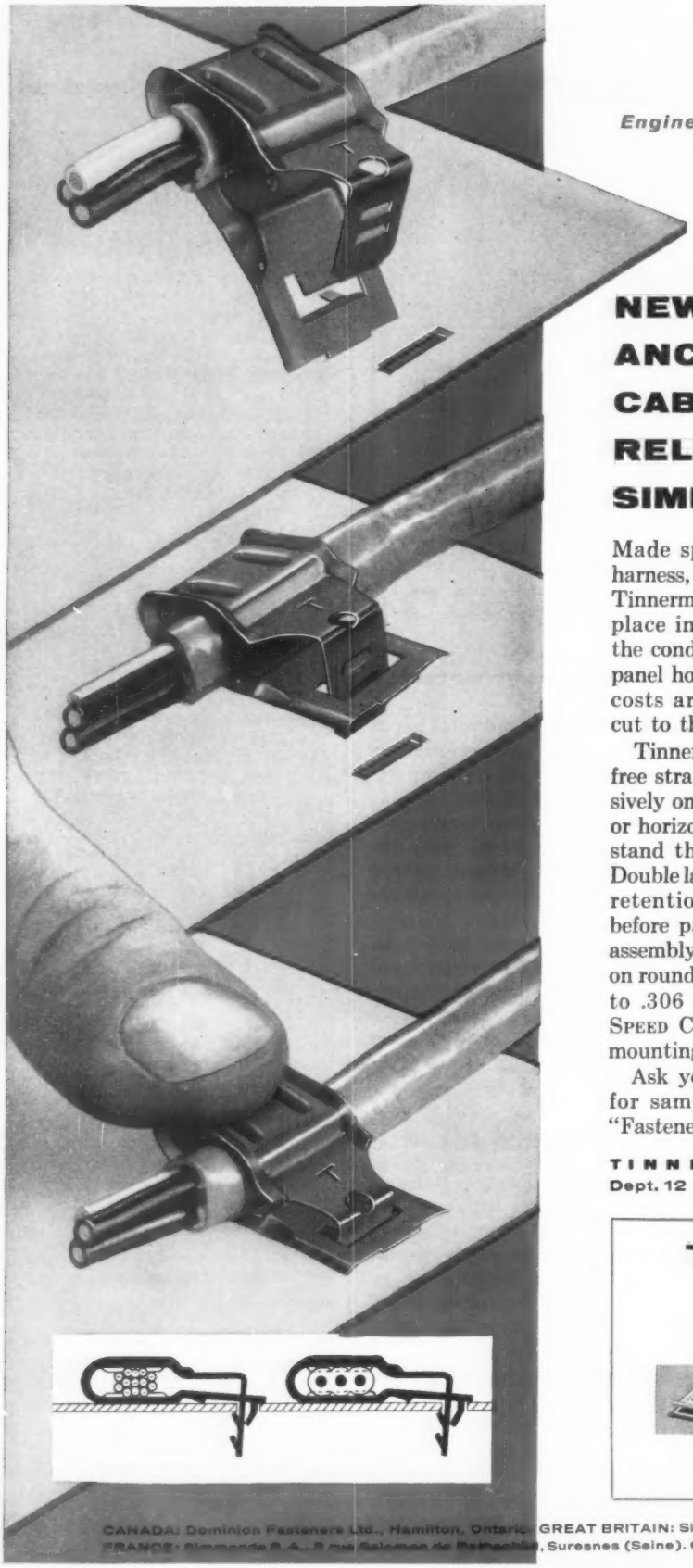

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Made specifically to attach cables, wires, harness, or tubing firmly to panels, this newest Tinnerman SPEED CLIP is readily snapped into place in only 3 simple steps. Prelatch it on the conductor or tubing, insert SPEED CLIP in panel hole, then push home to lock. Assembly costs are reduced because assembly time is cut to the minimum.

Tinnerman SPEED CLIPS also serve as trouble-free strain-relief clamps—they are used extensively on appliances for attaching 3-wire round or horizontal section rib cord, and easily withstand the 35-pound pull test requirements. Double latch permits pre-assembly and accurate retention of SPEED CLIPS to wire or harness before panel assembly for further savings in assembly time. Double-rib retainers grip tightly on round or rectangular cords from .175" round to .306 x .515" rectangle. Important, too, SPEED CLIPS can easily be removed from the mounting side.

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R. A. EMMETT JR.
Detrex v. p.-mfg.

WILLIAM S. ALDEN
heads Porter-Cable (Canada)

HENRY PETRONIS
Pall v. p.-mfg.

PAUL N. STANTON
P&W v. p.-marketing

R. A. Emmett Jr., vice president of **Detrex Chemical Industries Inc.**, was placed in charge of all manufacturing—chemical and equipment, and will also direct activities of the Detrex Laboratory and research center in Detroit.

William S. Alden was made managing director of **Porter-Cable Power Tools (Canada) Ltd.**, Kingston, Ont., subsidiary of Porter-Cable Machine Co.

C. A. Liming was promoted to marketing manager-power capacitors for **Federal Pacific Electric Co.**, Newark, N. J. He joined the firm six months ago as corporate engineering manager-pole line equipment. Previously, he was sales manager of electrical apparatus for Hubbard & Co.

Jack H. deKruif, formerly with Hughes Aircraft Co., was made vice president-marketing and sales for **Warner Electric Brake & Clutch Co.**, Beloit, Wis.

Ralph E. Bennett was made Pacific Coast regional manager for **Dynamatic, Cleveland Worm & Gear,** and **Farval Divisions** of Eaton Mfg. Co. He will supervise sales activities, with headquarters in San Francisco.

Robert G. Emmett was made assistant superintendent at **Youngstown Sheet & Tube Co.'s** Indiana Harbor Works, East Chicago, Ind.

N. Stuart Dean was made sales manager, Automotive Div., **Fasco Industries Inc.**, Rochester, N. Y.

Henry Petronis was elected vice president-manufacturing, **Pall Corp.**, Glen Cove, N. Y., and its subsidiaries and divisions. In addition, he continues as president of Glen Components Corp., precision machining subsidiary.

Paul L. McCulloch Jr. was elected a vice president of **American Brake Shoe Co.**, New York, and made group executive of its newly formed Industrial Castings Group, composed of four divisions—American Manganese Steel Div., Electro-Alloys Div., Engineered Castings Div., and National Bearing Div. Mr. McCulloch was president, Electro-Alloys Div., and is succeeded by **William D. Raddatz**, former vice president.

Robert B. Bradley, former president of International Harvester Co. of Canada Ltd., was elected vice president and executive head of Construction Equipment Div., **International Harvester Co.**, Chicago. He succeeds **Harald T. Reishus**, retired.

Thomas W. Flood, former vice president of Electric Autolite Co., joined **Willys Motors Inc.**, Toledo, Ohio, as special assistant to the president. He is assigned to duties in connection with Willys' expanding domestic and export trade.

Thomas A. Carter Jr. was named manager, Cryogenics Div., **Standard Steel Corp.**, Los Angeles.

Charles S. Marshall was made manufacturing superintendent, **Rubicon Div.**, Philadelphia, Minneapolis-Honeywell Regulator Co.

Paul N. Stanton was named vice president-marketing, **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He was general sales manager, Clearing Machine Corp., division of U. S. Industries Inc. He takes over the new post July 11.

Jack S. Pettersen was made director of marketing, **Norge Div.**, Borg-Warner Corp., Chicago. He succeeds to the post held by **Walter C. Fisher**, named Norge vice president-sales in March.

J. G. Skaaren was made assistant to the president, **Stran-Steel Corp.**, Detroit, division of National Steel Corp. He is succeeded as general sales manager by **F. E. Daggett.**

William E. Ballantyne was made assistant sales manager, **Parker Hydraulics Div.**, Parker-Hannifin Corp., Cleveland. He was with the Industrial Products Div. of Cessna Aircraft Co.

Baltimore & Ohio Railroad Co., Baltimore, named **C. R. Wheeler** purchasing agent, succeeding **Virgil N. Dawson. Charles E. Bertrand** was named to the new post of assistant vice president-operation and maintenance.

Ralph R. Beals joined the sales and marketing staff of **Carondelet Foundry Co.**, St. Louis.

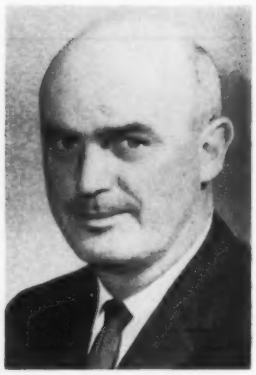
Wayne C. Keith was named acting manager of **Aluminum Co. of America's** Cleveland Sales Development Div.

Hollis Conner was made sales man-

HAROLD A. HALLSTEIN JR.
Gregory field sales mgr.

DAVID E. GLASS
Producto Machine div. sales

THOMAS W. GULLEY Jr.
Singleton president



JOHN McKANE
Engineered Ceramics sales mgr.

ager of **Hyster Co.**'s International Div., Peoria, Ill.

Harold A. Hallstein Jr. was made general field sales manager of **Gregory Industries Inc.**, Lorain, Ohio. He was a product sales manager.

Joseph R. Maslove Jr. was made sales manager, **Fluid Regulators Corp.**, Painesville, Ohio. He was district sales manager in New Jersey for Hartford Steel Ball Bearing Co.

New Process Twist Drill Co., Taunton, Mass., announces a new line of machine screw and fractional hand taps for the New England market. **Merrill Hunt**, works manager, was assigned management of the new operation.

Charles H. Day was named general manager, Northeastern district, **Continental Can Co.**, with headquarters in New York. He was manager of manufacturing for the Bondware Div.

Pyles Industries Inc., Detroit, subsidiary of Kent-Moore Organization Inc., appointed **C. G. Davis** sales manager-distribution, and **J. E. Flynn** sales manager-direct.

O. A. Linse was made assistant to the vice president of the Pomona, Calif., Div. of **Marquardt Corp.** He was assistant to the president and sales manager of Burton-Rodgers Inc., Cincinnati.

William R. McGarry was elected a vice president of **United States Concrete Pipe Co.**, Cleveland, subsidiary of Pittsburgh Coke & Chemical Co. He was manager of its Ft. Lauderdale, Fla., plant.

David E. Glass was appointed sales manager, Machine Tool Div., **Producto Machine Co.**, Bridgeport, Conn. He was New England sales manager of Consolidated American Machinery Co.

Thomas W. Gulley Jr. was elected president of **Singleton Co.**, Cleveland. **Thomas R. Gill** was elected vice president-treasurer, **Kenneth Kolinski** secretary.

William P. Carpenter was named to the new post of sales manager, Vacuum Furnace Div., **Richard D. Brew & Co. Inc.**, Concord, N. H.

Coffing Hoist Div., Duff-Norton Co., named **Frank H. Heyden** hoist product engineer, responsible for engineering and development of new and improved hoist products. He is at the new plant in Charlotte, N. C., where the Jack and Hoist Divisions are being consolidated and relocated.

Lloyd F. Christensen was made director of sales engineering for **General Motors Corp.'s** manufacturing development, Warren, Mich.

John J. Gell was appointed assistant general manager of manufacturing, Lock & Hardware Div., **Yale & Towne Mfg. Co.**, White Plains, N. Y.

Richard W. Park was made Southern Industrial Div. manager, **Republic Supply Co. of California**, Los Angeles.

John M. French joined **Pennsalt Chemicals Corp.** at Natrona, Pa., as manager of development for its Corrosion Engineering Products Dept.

Engineered Ceramics Mfg. Co., Chicago, appointed **John McKane** sales manager; **Ken Weber** assistant sales manager.

Robert A. Foster was named sales manager, Industrial Div., **Boyer-Campbell Co.**, Detroit. He was branch manager of Boyer-Campbell-Plymouth.

Lawrence H. Remstein was made manager of roll formed sections at **Solar Steel Corp.'s** Hanover Div. plant in Union, N. J. **William E. Doyle** joined the division's sales force.

Paul W. Arnold was made assistant to the vice president of research, development, and engineering at **Reliance Electric & Engineering Co.**, Cleveland.

Kenneth W. Burkhardt was made director-design standardization, **American-Standard Industrial Div.**, American Radiator & Standard Sanitary Corp. He has headquarters in Dearborn, Mich., at the Industrial Div. home office.

Walter T. Miiller was named Chicago district sales manager, **Bohn Aluminum & Brass Corp.** He will supervise sales in Greater Chicago, northern Illinois, and Iowa of all Bohn's product line except heat transfer products.

Jack R. Gerlach joined the Belting Sales Dept. of **C. R. Daniels Inc.** to cover Ohio, Western Pennsylvania, and Western New York. He was sales manager for Cleveland Punch & Shear Co.

Richard E. Clark was made manager of aluminum product sales at

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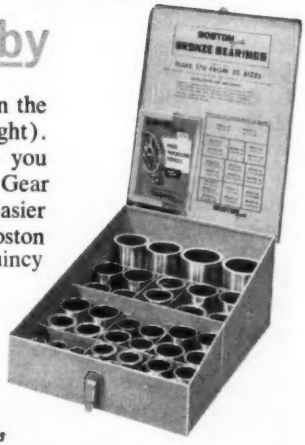

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CF&I Buffalo-gen. supt.

DAVID H. SHEARER
Premier Industrial purchasing

ROLAND HECKER
Burg Tool chief eng.

HENRY MAIKOWSKI
Marlin-Rockwell post

CHARLES D. BROWN
GE-Instrument Dept. mrkt.

the Detroit plant of **Joseph T. Ryerson & Son Inc.**

Roland Hecker was made chief engineer of **Burg Tool Mfg. Co. Inc.**, Gardena, Calif. His previous experience includes 12 years at Lodge & Shipley Machine Tool Co., and nine years with Giddings & Lewis Machine Tool Co.

Henry Maikowski was made factory superintendent, responsible for manufacturing operations at **Marlin-Rockwell Corp.**, Plainville, Conn., plant. He succeeds **Enrico L. Bossi**, now staff assistant to the plant manager.

Donald C. Behner was made Cleveland district sales manager, **North American Refractories Co.**

Vincent S. Day was made executive assistant to **H. C. Hoffmann**, general sales manager, Machinery & Systems Div., **Carrier Corp.** He is replaced as sales manager, centrifugal refrigeration equipment, by **A. G. Hillen.**

Charles D. Brown was appointed manager-marketing at **General Electric Co.'s** Instrument Dept., West Lynn, Mass. He was marketing manager at the Light Military Electronics Dept., Utica, N. Y.

Victor Frederiksen was appointed works manager, **Moto-Mower Inc.**, Richmond, Ind., subsidiary of Dura Corp. He was manufacturing manager, Richmond Drill Div., Bucyrus Erie Co.

Jerry D. Maxa was made general sales manager, **Koehler Aircraft Products Co.**, Dayton, Ohio, subsidiary of New Britain Machine Co. For the last three years, he served as assistant sales manager, Precision Products Div., parent firm, in New Britain, Conn.

Carl C. Landegger was appointed executive vice president, **Black-Clawson Co.**, New York. He has been active in management of the Paper Machine Div. in Watertown, N. Y., and the Shartle Div. in Middletown, Ohio.

Robert P. Jensen was made manager of industrial foil, laminations, and containers for the Products Div. of **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif. He is succeeded by **Robert H. Lucas** as industrial foil and container sales manager. Mr. Jensen is responsible for both the production and sales of the industrial foil line. Mr. Lucas was central regional sales manager.

James H. Richardson was appointed general superintendent of **Colorado Fuel & Iron Corp.'s** Buffalo plant. He was product development manager for CF&I's Eastern Div.

David H. Shearer was made manager of purchases, **Premier Industrial Corp.**, Cleveland, a newly created post.

W. E. Erbe, formerly with Electric Service Works, **Delta-Star Electric Div.**, H. K. Porter Company Inc., was made district manager of the division's Pittsburgh office. He succeeds **J. F. Zboyovsky**, made sales manager of the division's Thomas Works in Lisbon, Ohio.

Dr. Charles D. Harrington was named vice president of **Mallinckrodt Nuclear Corp.**, subsidiary of Mallinckrodt Chemical Works, St. Louis. He continues general supervision of the Uranium Div. activities at Weldon Spring, Mo.

OBITUARIES...

G. William Gauger, 54, president, **Commercial Cam & Machine Co.**, Chicago, died June 20.

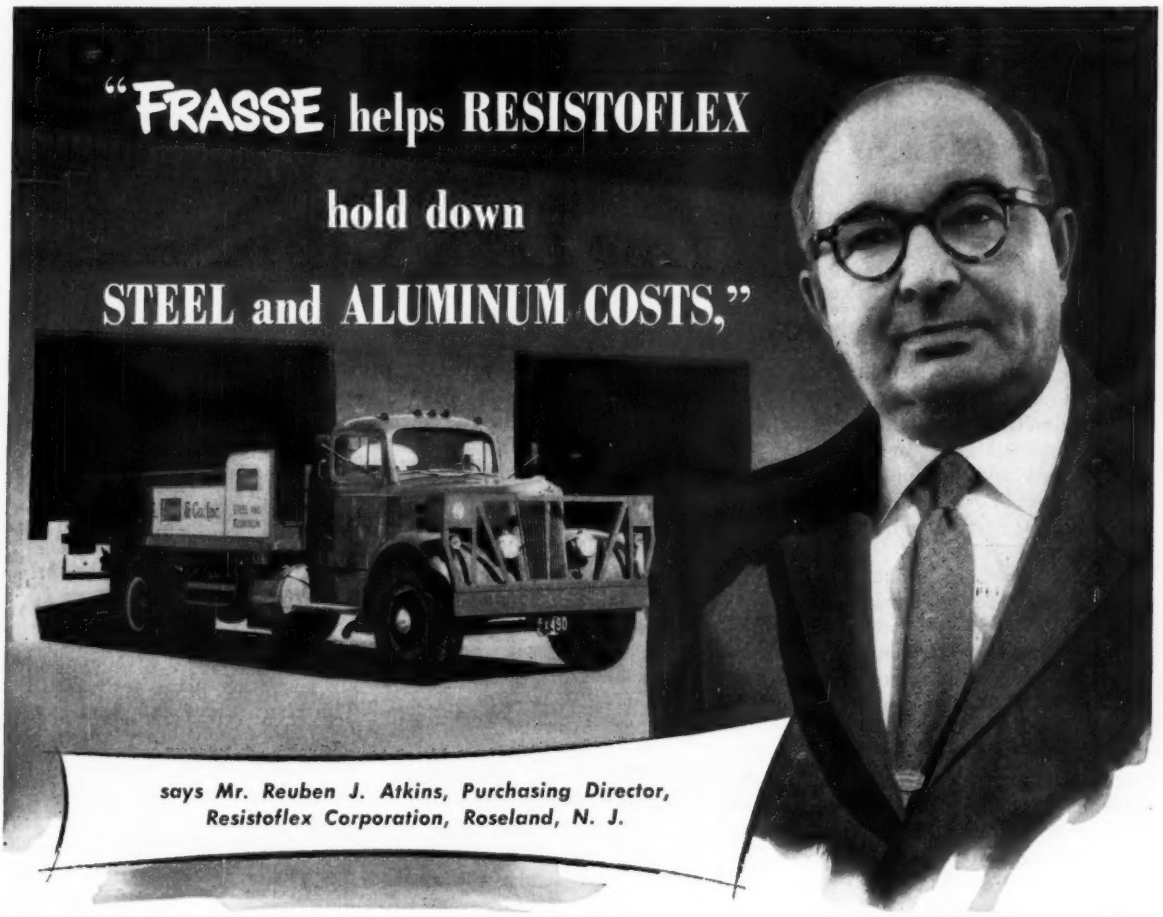
Richard E. Smith Jr., auditor for **Mesta Machine Co.**, Pittsburgh, died June 7.

Louis F. Surridge, 60, assistant general manager, Utica, Mich., Div., **Curtiss-Wright Corp.**, died June 19.

F. P. Rice, 49, director of operations, **International Resistance Co.**, Philadelphia, died June 20.

Philip M. Zenner, 63, president, **Royal McBee Corp.**, Port Chester, N. Y., died June 19.

William H. Roberts, 42, executive vice president, **Detroit Stamping Co.**, Detroit, died June 21.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More U. S. Firms Seek Share of World Markets

ESTABLISHMENT of subsidiaries abroad and negotiation of licensing and other agreements (STEEL, June 27, p. 53) are mushrooming. Recent announcements include:

• **Burroughs Corp.**, Detroit, has organized Burroughs International S. A., Fribourg, Switzerland, which will be responsible for the development of new and existing markets. E. G. Wallace is president and managing director of the firm.

• **Chromalloy Corp.**—Machinable, carbide tool materials developed by this firm's Sintercast Div. will be produced in West Germany under license to Deutsche Edelstahlwerke A. G., Krefeld, Germany.

• **Ellicott Machine Corp.**, Baltimore, has concluded a licensing agreement for the building of dredges and dredge equipment in India with the Hooghly Docking & Engineering Co. Ltd., Calcutta. Hooghly is a major shipbuilding and marine engineering company in India.

• **Torrington Co.**, Torrington, Conn., is constructing a plant at Wurselen, West Germany, for the production of needles and bearings. The new plant will replace the company's smaller facility at Aachen, 5 miles away. Oskar Klemm is managing director of the German subsidiary.

• **Clark Equipment Co.**—Clark Equipment International C. A., subsidiary of the Buchanan, Mich., firm, has authorized its Belgian licensee, La Brugeoise et Nivelles S. A., St. Michel-lez-Bruges, to produce Clark's line of hydraulic valves, pumps, and other hydraulic components.

• **Bettinger Corp.**, Milford, Mass., processor and fabricator of ceramic-on-metal products, has signed its eighth foreign licensee agreement with Kockums Jernverks, Kallinge, Sweden. The firm has extensive enameling facilities and is a major supplier of automotive parts in Sweden.

• **American Bosch Arma Corp.**, Hempstead, N. Y., and DeHavilland Holdings Ltd. have acquired joint ownership of S. G. Brown Ltd., Watford, England, producer of precision navigation and gyroscopic equipment. DeHavilland is a member company of the Hawker Siddeley Group.

• **Austin Co.**, Cleveland, will provide complete engineering and construction service to U. S. and Canadian firms planning construction in Australia. Services will be provided under an agreement with A. J. Anderson (N.S.W.) Pty. Ltd., North Sydney, Australia.

• **Dodge Mfg. Corp.**, Mishawaka, Ind., organized Dodge Mfg. International A.G. with headquarters in Zug, Switzerland. The new firm will acquire and render technical and management assistance to Dodge licensees abroad. Dodge International has acquired a majority interest in a new operating subsidiary, Dodge de Mexico S.A., Mexico City, Mexico.

• **Sandvik Steel Works Ltd.**, parent company of Sandvik Steel Inc., Fair Lawn, N. J., is building a tube mill in Sweden for hot extrusion of stainless steel tubing. The $6 million mill is scheduled to be in operation by 1962.

• **Beckman Instruments Inc.**, Fullerton, Calif., will begin operation this month of two new Swiss subsidiaries which will serve as headquarters for the company's foreign sales and manufacturing activities. The new firms with headquarters in Geneva are: Beckman Instruments International S. A. and Beckman Instruments Investment S. A.

• **Ultrasonic Industries Inc.**, Albertson, N. Y., has formed a subsidiary, Ultrasonic Industries (Canada) Ltd., Toronto, Ont. It is the first of several such companies contemplated by UI in the development of international markets for its ultrasonic devices, including cleaning equipment.

• **Radio Corp. of America**, New York, will open a research laboratory in Japan to conduct fundamental studies in the physics and chemistry of solids. The new organization will be known as Laboratories RCA Inc., Tokyo, Japan. Dr. M. C. Steel is director of research of the new laboratory.

• **Meehanite Metal Corp.**, New Rochelle, N. Y., has organized and licensed Metais Meehanite do Brasil, Rio de Janeiro, to manufacture more than 26 types of Meehanite metal.

Airco Opens Butler Plant

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, has placed on stream its liquid air separation plant at Butler, Pa. The plant has a daily capacity of 120 tons of high purity oxygen and will supply it by pipeline to the Butler Works of Armco Steel Corp. The multimillion dollar facility will also produce quantities of nitrogen and liquid argon. Armco will use the oxygen for the production of steel in its electric and open hearth furnaces, to scarf slabs, and for general plant maintenance. Armco uses nitrogen principally for the prevention of oxidation during the annealing of silicon steel.

Cooper-Bessemer Expands

Cooper-Bessemer Corp., Mt. Vernon, Ohio, is erecting a 72,000 sq ft building to house its En-tronic Controls Div. (automatic control of engines and compressors). Cost of building and equipment: $200,000.

Automates Plate Mill

Westinghouse Electric Corp., Pittsburgh, will furnish Prodac computer, programed control for U. S. Steel Corp.'s plate mill at Gary, Ind. In addition, Westinghouse will supply a 10,000 kv, Ignitron converter-inverter power system, 400 cps Magamp regulators, main drives, and auxiliary equipment totaling about 36,000 hp. The 160/210 in. reversing plate mill will handle slabs ranging from 3

to 24 in. thick, 48 to 75 in. wide, and 54 to 264 in. long. Finished plates will range from 3/16 in. thick, 198 in. wide, and 45 to 125 ft long.

CONSOLIDATIONS

Precision Processing Co. (machine tool attachments) and **King Machine & Mfg. Co.** (sheet metal tools) have merged under the King name. Officers of the consolidated firm are: President, Merlyn Herman; vice presidents, G. W. Sanders and James Larson; sales manager, Jack Davis; and chief engineer, Tito Gualdoni. Facilities at 1171 E. 32nd St., Los Angeles 11, Calif., contain 40,000 sq ft of manufacturing space.

Kawecki Chemical Co., Boyertown, Pa., purchased 50 per cent of the common stock of **Penn Rare Metals Inc.**, Revere, Pa. Kawecki produces rare metals and their compounds (tantalum, columbium, selenium, titanium, boron, zirconium, and master base alloys, particularly aluminum). Penn produces germanium, cesium, and rubidium metals and salts and other high purity intermetallic compounds.

Joseph H. Fox & Co. Inc., Birmingham, purchased **F & P Steel Pipe Corp.**, Jacksonville, Fla., producer of electricweld steel pipe 4 through 14 in. in diameter. Officers of F & P Steel are: President, J. H. Fox; executive vice president, R. C. Crumbaugh Jr.; and vice president-operations, W. C. Beattie.

Wisconsin Centrifugal Foundry Inc. acquired **Wisconsin Stainless Foundry & Machine Corp.**, both of Waukesha, Wis., and will operate the facility as its Stainless Div. Officers are: President, M. E. Nevins; vice president and works manager, P. J. Schneider; vice president and stainless technical director, Warren Williams; and secretary, K. M. Kenney.

General Casting Corp., Charlestown, N. H., purchased **National Precision Casting Corp.**, Paoli, Pa., formerly a subsidiary of the Beryllium Corp., Reading, Pa. National will continue to operate in its present location. Inquiries may be addressed to either the Paoli plant or to Z & H Mfg. Co., a division of General Casting Corp., Peekskill, N. Y.

H. Fischer & Associates Inc. purchased **May-Fran Mfg. Co.**, both of Cleveland. The Fischer organization provides engineering services from product design to plant layout. May-Fran produces conveyors, belting, and special purpose equipment and machinery.

Kollmorgen Optical Corp., Northampton, Mass., and **Inland Motor Corp.**, Radford, Va., and Pearl River, N. Y., have merged under the name of Kollmorgen Corp., Northampton. Kollmorgen produces submarine periscopes and other precision optical, mechanical, and electronic equipment and systems; Inland, torque motors and rotary amplifiers.

NEW PLANTS

Superior Hone Corp., Elkhart, Ind., opened its new plant at Erwin, Tenn. The first production line in the 15,000 sq ft plant is in operation.

Ducommun Metals & Supply Co. opened its expanded metal service center at 2550 Seventh St., Berkeley, Calif. Storage capacity has been increased to 110,000 sq ft. Metal shearing, sawing, flame cutting, and grinding equipment and cranes for handling metals have been installed. J. W. Rabb is general manager of the new plant.

Acme Industries Inc., Jackson, Mich., will build a 120,000 sq ft plant at Greenville, Ala., for the manufacture of air conditioning and refrigeration equipment. Cost of building and equipment: About $650,000.

Hooker Chemical Corp., Niagara Falls, N. Y., plans to build a multimillion dollar plant near South Shore, Ky. The firm's Durez Plastics Div. will operate the plant for production of synthetic phenol.

Electric Autolite Co., Toledo, Ohio, intends to erect a multimillion dollar facility at Decatur, Ala., for the production of light automotive and industrial electrical items. Estimated cost of land, buildings, and equipment: $6 million to $7 million.

NEW OFFICES

Kaiser Steel Corp., Oakland, Calif., opened a sales office at 336 Korber Bldg., Albuquerque, N. Mex. Keith W. Meserve is the sales representative.

Kutztown Foundry & Machine Corp. opened its new office building in Kutztown, Pa.

Ajax Electric Motor Corp., Rochester, N. Y., established new branch office and warehouse facilities at 311 Foundry St. N. W., Atlanta, Ga. Edward After is district manager.

Trio Machine & Mfg. Co. opened enlarged factory and offices at 35700 Vine St., Willoughby, Ohio. Trio doubled its production area by adding 9000 sq ft of production space.

NEW ADDRESSES

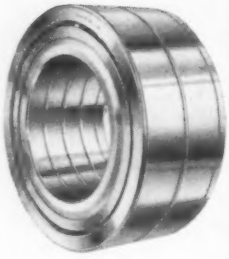
American Nickeloid Co., Peru, Ill., maker of preplated metals, moved its New York office to 1001 Franklin Ave., Garden City, N. Y. J. K. Storkman is in charge.

Pressed Steel Tank Co., Milwaukee, moved two district offices: The New York office to 1199 Main Ave., Clifton, N. J.; and the Chicago office to 6634 N. Western Ave., Chicago 45, Ill. Sales offices of the Downingtown Iron Works Inc., a division of Pressed Steel, have moved to the same new locations.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., moved its Atlanta district sales office to 830 W. Peachtree St. N.W.

Tap Cartridge Co. moved its offices and manufacturing facilities to 326 Railroad Ave., Cincinnati 17, Ohio. Robert M. Loebelson has been elected vice president. The firm makes wax cartridges for chip-free, blind hole tapping.

From left, Pratt and Whitney Aircraft's J-57, J-52, JT-12, and J-75, jet engines.



This typical Fafnir jet engine bearing is fabricated of specially processed alloy steels, the cleanest available. It is an angular contact type bearing with intricate split inner ring. All components are precisely fitted. Balls and raceways are precision-finished to millionths of an inch.

Fafnir main rotor bearings help carry the load in these Pratt & Whitney Aircraft jet engines!

In a jet engine, the only parts that "anchor" the massive main rotor are the bearings on which the rotor shaft rides. Fafnir is a major supplier of the main rotor thrust bearings that handle this critical assignment in Pratt & Whitney Aircraft jet engines.

Few applications put such a premium on unfailing performance . . . and few involve such operational extremes. The bearing has to support thousands of pounds of thrust load from the rotating parts of the engine, in addition to extremely heavy radial loads under maneuver conditions. They must not only carry these loads but also maintain precise positioning of the rotating parts at 10,000 to 15,000 R.P.M. speeds.

To insure the reliability necessary in this service, Fafnir and Pratt & Whitney Aircraft joined engineering talents to design the rotors for each rotor application. The bearings are practically flawless in every detail of materials and workmanship. The capabilities that produce these "bearing masterpieces" are also available to you. You can rely on Fafnir to meet your most exacting jet engine, accessory, or control bearing needs. Write The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS

BOLT PROTECTOR— Common steel bolts capped with a pressure resistant plastic can resist corrosive fluids as well as those made of stainless, claims U. S. Rubber Co., New York. The idea proved to be a cost saver for A. O. Smith Corp., Milwaukee, which adopted it as a fastening for glass-lined steel silos.

WIRE CLOTH RESISTS HEAT— Parachutes for slowing the re-entry of space vehicles will probably be made of fine nickel-chromium or cobalt-chromium alloys, states Arthur D. Little Inc., Cambridge, Mass. Those materials showed the most promise in tests done by the firm at Wright-Patterson Air Force Base, Ohio.

VACUUM NONMETALLIZING— The deposition of thin films of nonmetallics and metallics is said to be speeded up by an electron beam vaporizer developed by the Alloyd Corp., Boston. The firm claims the unit can be used for production or research.

MIDGET REACTOR FUEL— Columbium-uranium alloys show great promise as a fuel for small reactors, says Battelle Memorial Institute, Columbus, Ohio. It has excellent tensile strength and hardness at 1600° F, bypassing the 1200° F swelling problem confronting present day fuels. Other advantages noted by the Battelle metallurgists: High heat conductivity, good corrosion resistance, and excellent retention of fission gases.

EXPERT TRANSISTOR— Bell Telephone Labs, Murray Hill, N. J., says its latest transistor is faster and consumes less power than current types. Expectations: New computers will be faster than ever.

THE WORLD DOES TURN— Most of us are satisfied to accept without question the statement that the world turns. Arma Div., American Bosch Arma Corp, Garden City, N. Y., has proved it. Combining a high precision calibration centrifuge and the accelerometer used in the Atlas guidance system, no celestial measurements were needed. The centrifuge was spun in the direction of the earth's rotation, then reversed. The accelerometer was able to measure the small rate effect of the earth's rotation on the centrifuge motion. Precise measurements of acceleration are required for inertial guidance of missiles and rockets.

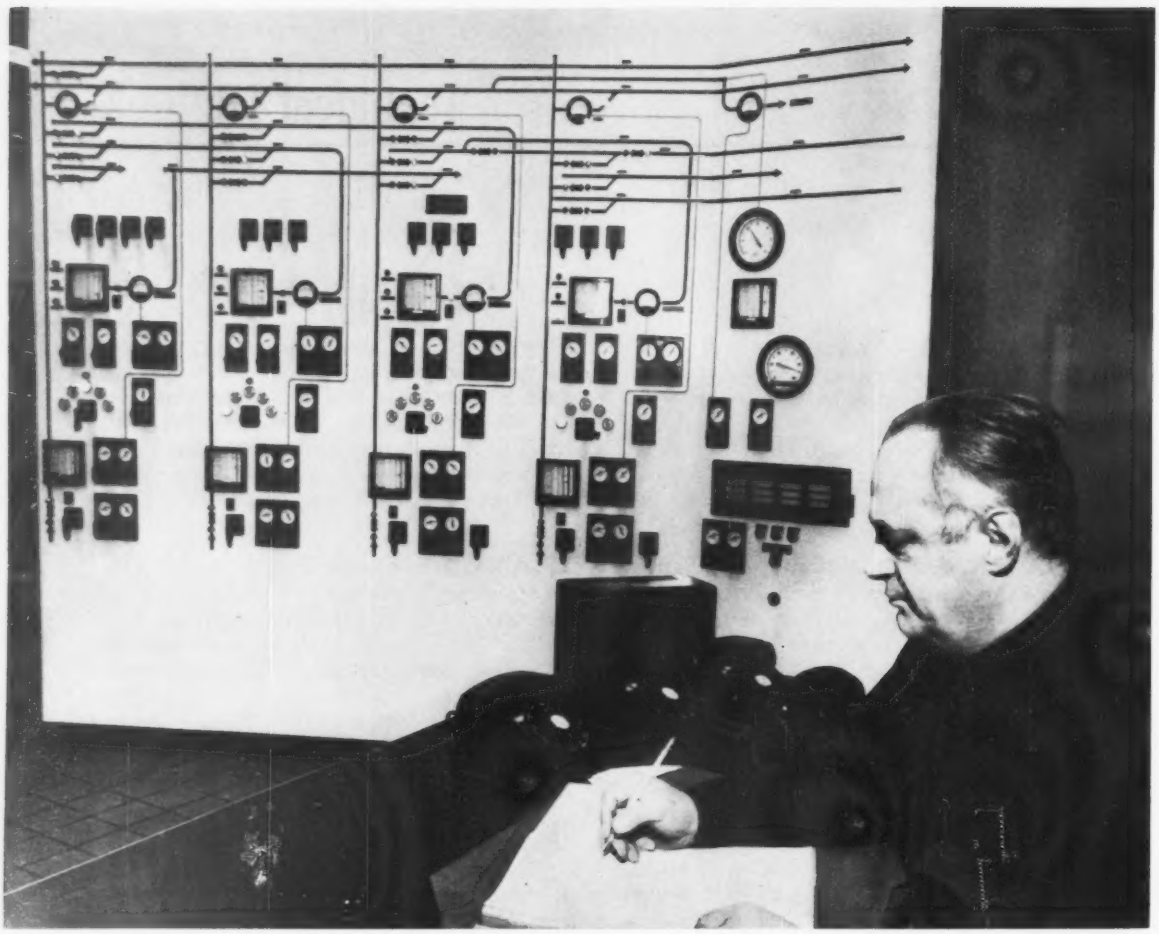
EXPLAINS CREEP— Microscopic evidence points to a connection between intergranular cavities and microstructure in creep fracture specimens of Nimonic 80-A alloys. Contrary to some views, intergranular cavity type depends on carbon content and microstructure, rather than the way tensile stress is applied, says C. W. Weaver, Defence Standard Laboratories, Department of Supply, Maribyrnong, Victoria, Australia.

METALLURGICAL NOTE— Researchers are looking for ways to make 0.000001 in. powder particles that could improve the physical properties of exotic and refractory alloys, says National Research Corp., Cambridge, Mass. The secret: Compositions could be made more exact.

BETTER UNDER PRESSURE— You can cut gas consumption of car-type heat treating furnaces by increasing furnace pressure, claim British scientists. For one thing, higher pressures prevent air infiltration. An optimum is involved: Excessive pressures can increase consumption. Automatic pressure control can probably be justified by increased efficiency and control of results.

METAL "GROWS" TO SHAPE— Germanium tunnel diodes for computers are made of strips grown to exact size and shape by a dendritic crystal process. It permits greater efficiency, less waste in handling the high cost material, says Westinghouse Electric Corp., Pittsburgh.

QUIETER PIPE— Auto exhaust pipes made with a patented laminated material cut "tinny" sounds and improve acoustical properties, says Arvin Industries Inc., Columbus, Ind.



A central control panel regulates air flow from four turboblowers to four blast furnaces in a split wind system at United States Steel's Gary Works

Automation, of Course; But How Far, How Fast?

Application of electronic instruments and controls as they become economically and technically feasible may help prevent unnecessary capital spending

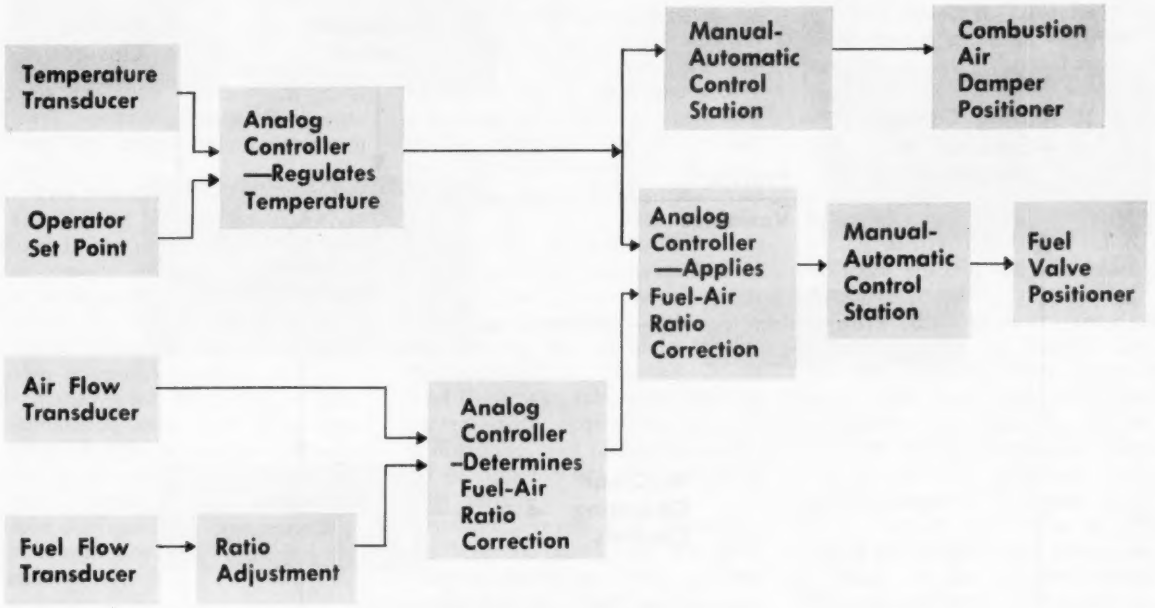
MANAGEMENT can profit by taking a step by step approach to total automation of a process or plant, says Robert E. Blackwell, manager, steel industry sales, Controls Div., Hagan Chemicals & Controls Inc., Pittsburgh. Control, data handling, and computing equipment is available for a gradual, co-ordinated changeover to automatic operation.

In the headlong approach often followed, where all steps are taken at once, expensive computing and logging equipment is often left idle or doing only a part of the job it was designed for, says Mr. Blackwell.

• The company should consult its own engineers and responsible equipment manufacturers when planning to automate a plant or process, say the experts.

Management should determine

Computers Control Furnace Temperatures



Analog control equipment, built around magnetic amplifiers, regulates temperature, fuel-air ratio, furnace pressure, recuperator temperature balance, and combustion air pressure in a two zone, slab heating furnace at an Eastern steel plant

how much and what kind of improvement can be realized by automation. It should study what is known and what must be learned of the process and its performance equations to define computer control functions. Responsibility for automation of the process should be placed with the right people—the equipment manufacturer, the user, or both. And a check should be made of available sensing instruments that can supply all necessary process information.

Many control engineers, experienced in process control problems, predict that analog computer control loops will continue to handle most processes, and digital computer-loggers will be used to supply more sophisticated commands. The logic: Process variables are analogs, or continuous functions, adaptable to analog control. And the analog control system can start and run the process normally while the computer-logger is down for maintenance.

• Equipment experts say steps toward complete process control should be taken carefully.

Many control manufacturers with process experience and the ability to supply analog computers and digital data loggers feel that optimal control by computers should be adopted only where it is economically and technically justified. They recommend the following steps, taken one or more at a time:

1. Install an electronic, solid state, analog control system that presents process variable data in a form compatible with the computer-logger. It would readily accept optimal commands from a computer.

2. Install a solid state, scanning-logging data system. Operation of such a system and careful analysis of the data should lead to more intelligent and efficient use of the computer function.

3. Add computer capacity to utilize processed data.

4. Apply computed data as commands designed to optimize analog loops.

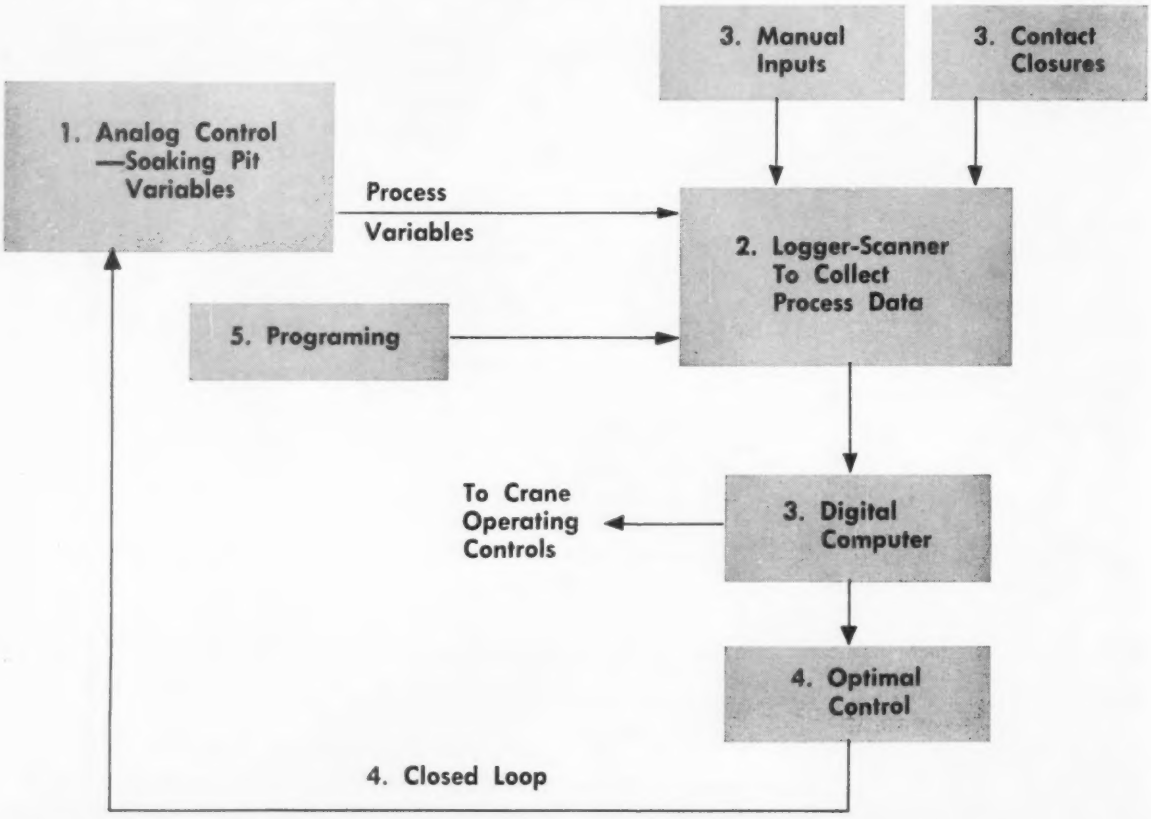
5. Add programing capacity for automatic startup, shutdown, and other daily functions. That could be done after all plant hardware for such operations has proved itself.

• At an Eastern steel mill, the first step was taken recently in a program that may include complete automation of a two zone, slab heating furnace.

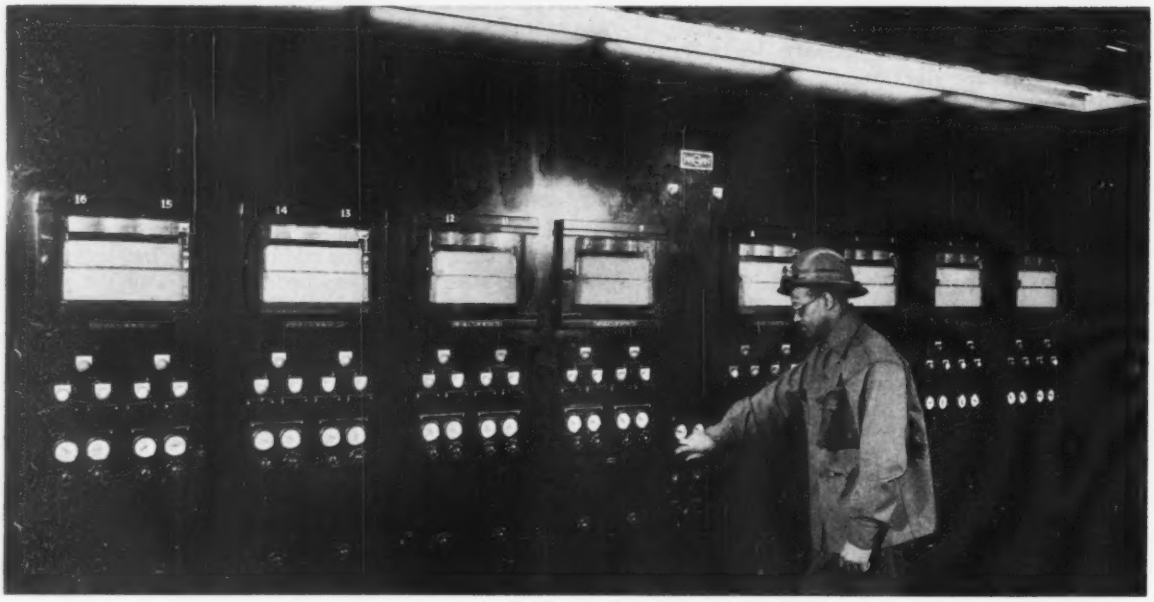
Solid state, magnetic, analog computer equipment has been purchased to control zone temperature, fuel-air ratio, furnace pressure, recuperator temperature balance, and combustion air pressure. Selection of electronic controls will permit the addition of logging, computing, and optimal control of the process when those features are economically feasible.

The system will use magnetic amplifiers, functioning as analog controllers, and said to be extremely reliable. Each controller compares two analog voltages that represent the desired and actual values of the controlled variable. The controllers determine the direction and magnitude of departure from the desired value, duration of the error, and its rate of increase or decrease. Then they compute the valve or

Five Steps to Automatic Soaking Pits:



Soaking pit automation will probably be accomplished in logical steps; computer control will be applied gradually, as more is learned about process variables



Master panel positions blast furnace tuyere valves. The valve on the tuyere meeting most resistance is opened wide but kept in throttling range

damper position needed to reduce the error to zero. Analog voltages from the controllers cause valves or dampers to take the required position.

• Simplicity of the electronic circuits and their similarity to pneumatic systems promise few problems for instrument maintenance people.

The control loops to be installed are similar to pneumatic systems used in the plant, with 1 to 9 volt dc signals replacing the familiar 0 to 30 psi pneumatic signals. Resistors can also be compared with needle valves, and capacitor values with volume reservoirs.

Management interested in total automation may find such comparisons useful in making the transition to electronic control equipment. And instrument departments will meet startup and maintenance problems with more confidence and success.

• Step by step automation is also applicable to other steelmaking processes.

An orderly approach to the completely automated steel plant is desirable to prevent adverse effects on earnings, says Mr. Blackwell. Process control experience, available to the industry from control and instrument manufacturers, will be helpful in making that approach.

Soaking pits may be automated in the relatively near future, but more information must be obtained about the process before the digital computer, optimal control, and programing are practicable.

Automatic controls have been in use for some time in the blast furnace area. Examples: At the Gary, Ind., Works, and at Ohio Works, McDonald, Ohio, United States Steel Corp. uses split wind blowing systems with centralized controls to distribute blast air from a number of turboblowers to a group of blast furnaces.

Automatic tuyere flow proportioning controls, also used on blast furnaces, make for more uniform distribution of blast air in the stacks, reducing blowing costs and possibly prolonging furnace wall life.

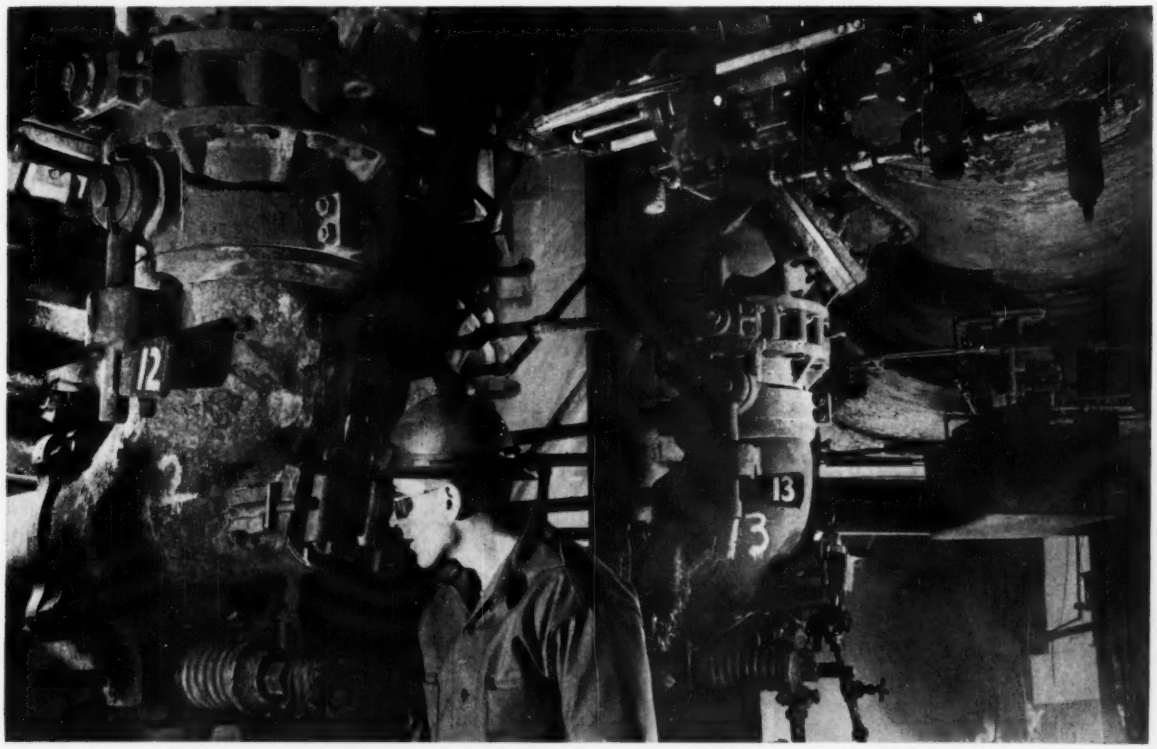
• Centralization and automation of controls help hold down operating costs in one company's antipollution program.

When Jones & Laughlin Steel Corp. elected to install electrostatic precipitators on 11 open hearths at its Pittsburgh Works, automatic controls were chosen to hold down operating costs.

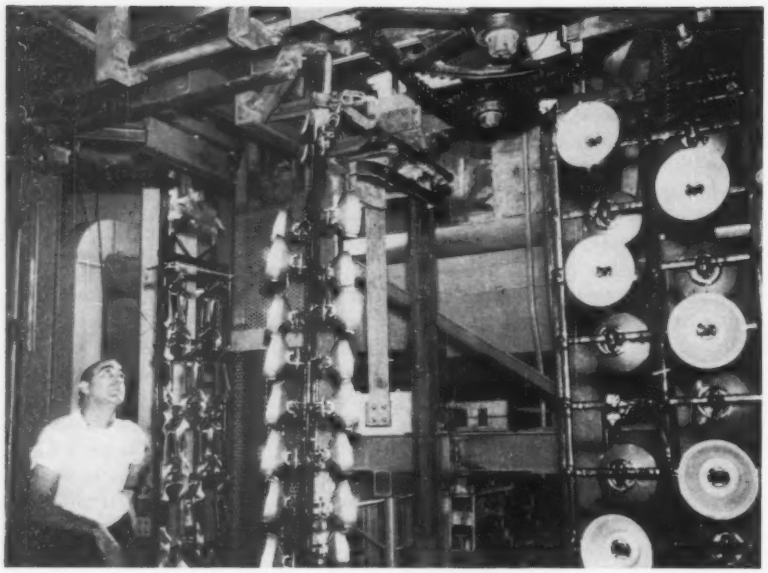
The company originally planned to put a control station at each waste heat boiler and precipitator, but decided on centralized controls for more efficient use of available manpower.

Solid state, magnetic amplifier systems, supplied by Hagan's Controls Div., regulate from a central panel boiler feed water, draft, and precipitator paralleling for the entire 1600 ft long open hearth shop.

A temperature indicator monitor, also supplied by Hagan, maintains constant supervision of 220 critical gas, bearing, and steam temperatures. It also monitors various pressures and levels, and warns the central operator of conditions calling for attention by a mobile maintenance detail.



Individual controller meters air flow through each tuyere with a butterfly valve in the transport line between the tuyere and the bustle pipe



Plating racks enter (right) the primary nickel bath, and leave (left). The short length of rail, directly under the righthand transfer wheels, lowers the rack into solution, making contact with a stationary rail in the new machine

Converting Plating Line Need Not Be Costly

THE DECISION to link new, auxiliary, nickel plating equipment to an existing plating line cut conversion costs by about $50,000 at Middleville Engineering & Mfg. Co., Middleville, Mich., a division of Jervis Corp.

The firm decided to convert its single nickel plating (one nickel coat) system to a binickel (two nickel coats) process rather than install completely new equipment or rebuild and extend present facilities.

• **Transfer System Is Hub**—Middleville had been plating automotive parts in a 90 ft, single row, automatic machine. Extending the line at either end was ruled out because of space limitations.

Udylite Corp., Detroit, suggested a layout which eliminated rebuilding the previous line, yet added a 40 ft semiautomatic unit. It extends at right angles to the original line at about midpoint. Automatic operation is retained with a hydraulic lift and transfer mechanism for conveying parts from one tank to another.

• **Procedure**—The primary (semibright) nickel plate is applied in the auxiliary tank. All other processing and plating are done in the original line.

The parts are loaded on racks hanging from cathode rails on the old line. After cleaning and rinsing, a copper strike is applied followed by a copper plate. The rack is then lifted and transferred to an intermediate cathode rail bridging the tanks. A shorter rail in the new tank receives the rack and lowers it into the solution.

Synchronized action reverses the operation on the exit end of the line. The racks re-enter the large tank for the second nickel plate and chrome coat to complete the operation.

Switching from single to combination plating can be done in 15 minutes, reports the company. And no additional manpower is needed even though 87 ft of traveling distance has been added. The system, operated by three men, can process 70 racks an hour.

• **Two Reasons for Change**—Adoption by Middleville of improved plating standards, the firm reports, can be traced to two dominant reasons: Warranty costs have mounted because of increased corrosion resulting from the greater use of road salts in metropolitan areas; auto people are also concerned lest competitive, corrosion resisting materials be resorted to.

Some of the basic standards being specified go back several years. General Motors, for example, is moving to Code 150 of the standards; will use Code 200 when necessary. (GM permits an option on its standards for each division.) Cadillac will be switching to the triple coat system for bumpers in 1961. Studebaker-Packard Corp. is expected to adopt the binickel system shortly—it follows AMC in this. A good example of the thicknesses and coats being applied is the list of Chrysler specifications shown in the exhibit.

Minimum Plate Thickness of Parts

PLATE	THICKNESS OF PLATE IN INCHES
Copper	0.0003 min
Nickel—Semibright	0.0008 min
Nickel—Semibright + Bright	0.0012 min
Copper + Nickel—Total Thickness	0.0015 min
Chromium	0.00001 min

Source: Chrysler Corp.

Shear Forming Aids Texas Aircraft Firm

Blank is formed over mandrel that conforms to inside diameter of the part

SHEAR FORMING can cut 60 per cent from part weight and bring substantial savings in production costs, says Temco Aircraft Corp., Dallas.

The firm has made a 12 in. nose cone from a flat sheet of tough alloy in less than 2 minutes. In many cases, it can start with a forging.

• Shear forming capitalizes on ductility.

The process, says Temco, is similar to wire drawing, extruding, or stretch reducing. Sometimes, ductility of a metal can be increased by heat treatment or by starting with a hot blank.

Particles of a metal tend to move along straight lines in one plane when stress is applied to force the particles apart. Metals tend to bend or break along many interior shear planes. Shear forming must be precise because the shearing point and breaking point are almost identical.

The blank is formed over a mandrel which conforms to the inside diameter of the part. One or more rollers (sometimes called tool rings) oppose the mandrel.

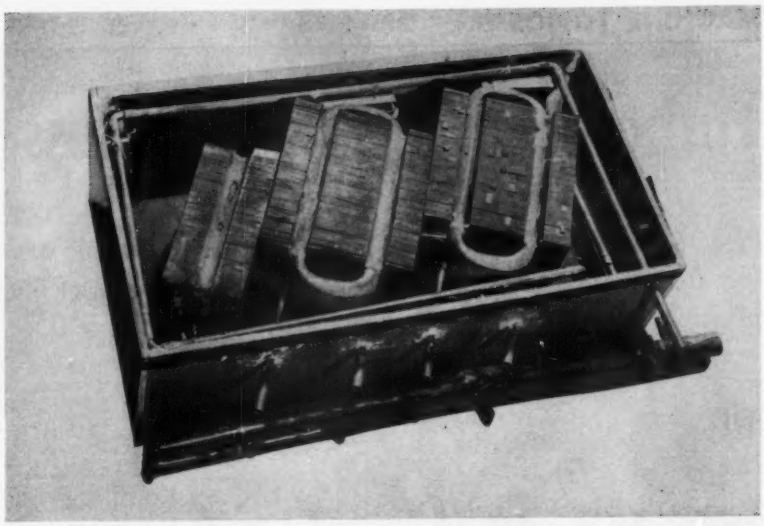
Both mandrel and part are rotated at 175 to 600 rpm. The mandrel advances toward the rollers at 100 ipm (maximum). It takes 650 psi hydraulic pressure to move the metal into shape.

Tool ring positions are governed by a stylus-template arrangement much like a tracer lathe. Some shapes require several shear forming operations.

• Shear forming is said to strengthen the metal.

The shearing action cold works the metal, breaking up large crystals into many small ones. The result is a stronger part.

Lubricants must be constantly sprayed on most jobs to reduce heat, says the company.



Bottom section of a continuous heating unit. Slanted coils furnish uniform heat along the entire portion of the metal

Slanting Coils Improve Flash Annealing Process

A NEW way of arranging wire conductors has improved continuous induction annealing of strip and sheets, reports the patentee, Penn Induction Corp., Pittsburgh.

• Heat Furrows Disappear—Coils were formerly arranged side by side. Strip passed through for annealing would be heated unevenly in some areas. Penn Induction tackled the problem under a program directed by Robert V. Lackner, chief electrical engineer.

His solution: Slant the coils so the flux lines from each electric coil overlap the one next to it. The overlapping produces even heat along the entire width of the metal.

The unit consists of a top and bottom section packed with water cooled copper coils mounted on stacks of silicon steel laminations. (The laminations were produced by Allegheny Ludlum Steel Corp., Pittsburgh.) Strip and sheets (steel, brass, copper, aluminum, and other metals) are threaded through the slots between the top and bottom heating sections for processing.

• Grain Size Reduced—Flash annealing exposes every portion to uniform heat. In most conventional annealing applications, tightly wrapped coils of metal are stacked in the furnace. They are not uncoiled, so the heat must work toward the center through successive layers of metal.

Outside wraps of the coil remain at peak temperatures longer than those in the center. Grain size growth is more evident on the outside layers than in the center layers.

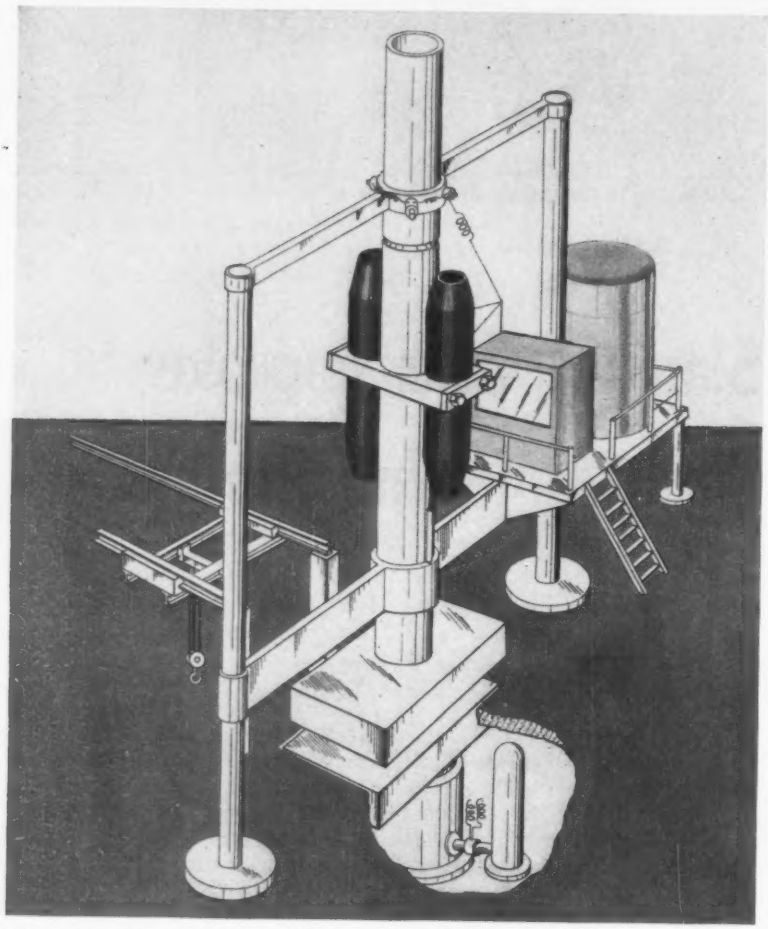
The coarser the grain, the more brittle the metal under strain.

• Larger Unit Planned—The firm's largest model can handle strip up to 48 in. wide. Aluminum and brass alloys 0.00035 to ½ in. thick have been heated.

Under consideration is the construction of a model that will handle 80 in. strip.

Turbojets May Power Press

Inventor feels the design would make the unit both simple and fast acting. He also cites other potential applications of the principle in diecasting, plastic molding, and extrusion



This is the patent drawing of the press. The two, opposed turbojet engines are shown mounted on the main ram. The fuel storage tank is behind the operator's control booth

ENGINEERS at Commonwealth Engineering Co. of Ohio, Dayton, Ohio, figure it may take some unconventional approaches to score breakthroughs in metalworking technology.

Example: They have a patent on a press that gets its power from aircraft-type turbojet engines.

• **Why**—The inventor, Harry A. Toulmin Jr., chairman, states in the patent that conventional presses rely on considerable "complicated equipment necessary to satisfactorily operate (at) high pressure."

Among the inventor's aims: To provide a high speed press that would be efficient yet eliminate many complicated mechanisms necessary for conventional units.

• **How It Works**—The press (see illustration) consists of a main center ram that runs on outboard guides. The platen is at the bottom of the ram.

Opposed turbojet engines are mounted on the ram. Controls are provided so the operator can selectively operate either of the jets, driving the ram and platen up or down.

The operator starts both jet engines. When the part is loaded and ready, he idles the upthrust engine and fires the downthrust engine, driving the ram and platen and closing the die. Then he reverses the engine settings to drive the platen and ram upward, opening the die.

• **Other Uses**—Although the patent details the application of the jet engines to a press (either vertical or horizontal), the inventor also states: "It is to be understood that (the principle) may be applied to other types of apparatus which function in a similar manner. Such apparatus would comprise metal forming machines and diecasting machines. In addition, plastic injection, plastic compression molding, and extrusion apparatus may be equipped to function by employing the jet principle."

Commonwealth hasn't built one of the presses. President Malvern J. Hiler says the firm intends to license the design.

Uranium Helps Steel

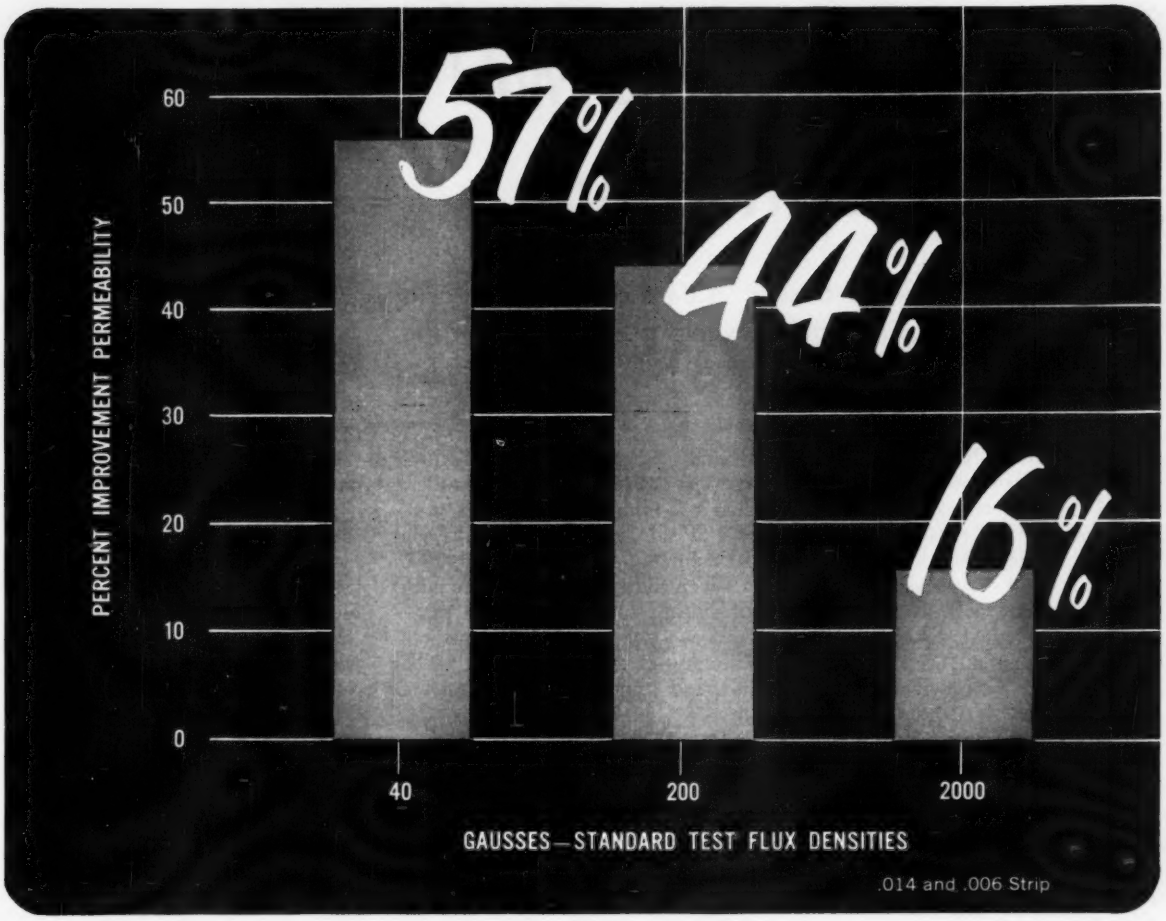
Four lb of uranium adds 30 per cent to the fatigue and corrosion resistance of a ton of steel, say Canadian government scientists.

Experiments by Canada's Department of Mines & Technical Surveys have proved exceptionally successful, claims John Convey, director. He adds that most U. S. steel firms are keeping tabs on the progress of the tests. (See STEEL, June 20, p. 123.)

Cost of the uranium is said to be small compared with total steel costs. It is also getting cheaper, Dr. Convey points out.

Radiation studies indicate the uranium alloys are not hazardous.

Experience**—the added alloy in **A-L Electrical Steels



Greater permeability for Allegheny Ludlum's AL-4750...and it's *guaranteed*

promises more consistency, higher predictability for magnetic cores

AL-4750 nickel-iron strip now has higher *guaranteed* permeability values than ever before. For example, at 40 induction gausses AL-4750 now has 57% higher permeability than in the past, using the standard flux density test.

This greater permeability means better consistency and predictability for magnetic core users . . . and allows careful, high performance design.

This improvement in AL-4750 is the result of Allegheny Ludlum's continuing research on electrical alloys and nickel-bearing steels. Moly Permalloy has been similarly improved in permeability. A-L constantly researches silicon steels, including A-L's well-known grain-oriented silicon, Silectron, and other magnetic alloys.

Complete facilities for the fabrication and heat treatment of laminations are available at Allegheny Ludlum. And A-L's technical know-how guarantees you close gage tolerance, uniformity of gage throughout the coil and minimum spread of gage across the coil-width.

If you have a problem on electrical steels, laminations or magnetic material, call A-L for prompt technical assistance. Write for blue sheet EM-16 for complete data on AL-4750. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. S-7.***

7491

ALLEGHENY LUDLUM

STEELMAKERS TO THE ELECTRICAL INDUSTRY

Export distribution, Electrical Materials: AIRCO INTERNATIONAL INC., NYC 17
Export distribution, Laminations: AD. AURIEMA, NYC 4

Collapsible Umbrella Mold Used to Make Hot Tops

Sheet metal pattern fits closely inside the ingot mold and supports the refractory material while it hardens; then the pattern is folded and withdrawn

CHEMICAL BONDING of sand rammed in a collapsible metal mold is said to give steelmakers high quality refractory hot tops at a modest cost per ton of steel poured. And a modified ingot shape promises increased product yield.

Cast hot tops are used in the electric furnace melt shop at Lukens Steel Co., Coatesville, Pa. They are called Tiger-Tops, for Bo Tigerschiold of the Degerfors Steel Works in Sweden, the inventor and developer of the collapsible umbrella mold used in the process.

• The method is based on the chemical reaction of carbon dioxide gas with sodium silicate.

Sand or slag is wetted with 4 to 7 per cent sodium silicate in a muller; then it is rammed in the mold. Carbon dioxide is passed through the packed material for 20 to 40 seconds.

When the gas reacts with the sodium silicate solution, silica is precipitated as a gel, causing an immediate stiffening or setting. The gel binds the sand grains into a rigid structure.

• Properly chosen, local sands should be used for most economical application of the method.

Experiments should precede application of Tiger-Tops, to determine what sands to use, proper mixtures of sand and sodium silicate, and the most suitable gassing time, says N. K. G. Tholand of Tholand Inc., New York agent for Degerfors Steel Works. If that procedure isn't followed, an unsatisfactory sand aggregate might be chosen; tops made of such material might spall or fall into the ingot mold.

Sand containing a high percentage of dust doesn't wet readily with sodium silicate and cannot be penetrated easily by the carbon dioxide.

Cold sand makes the sodium silicate extremely viscous on contact; care should be taken to wet all sand thoroughly, says Mr. Tholand.

• A collapsible metal umbrella fits tightly against the inner wall of the ingot mold until the hot top hardens.

The molds are made of light gage steel, with an integrated piping system and small gas outlets, about 6 in. apart. Sides of the umbrella are flared outward at the bottom to meet the inner wall of the ingot mold when the form is expanded. The sides are hinged so they can be drawn inward for removal from the ingot mold when the hot top is completed.

A close fit between the umbrella and the ingot mold is essential to give tops a feathered edge at the base. That reduces shoulder defects and permits easy removal of the form. Co-inventor Kristian Werner

1. Sand and sodium silicate mix, ready for casting, is dumped from the muller into a small hopper

2. Sheet metal umbrella, supported by four tubular legs, is positioned on the top of the ingot mold

METALGRAMS

UNION CARBIDE METALS

. . . news of "Electromet" ferroalloys and metals

JULY 1960

NEW LOOK IN FERROALLOYS -- Steelmakers are using greater tonnages of the new forms in which certain alloys are supplied by Union Carbide Metals. For example, refined chrome and 75 per cent ferrosilicon are available as convenient pigs that greatly simplify handling. When added to the furnace or ladle, these pigs give higher metallic yield because no fines are lost in the slag. Their use? Refined chrome is used in stainless steel, aircraft and bearing steels, tool steels, and cast iron. 75 per cent ferrosilicon is a popular open-hearth ladle addition, particularly in electrical steels.

* * *

UNIT-WEIGHT PACKAGES GROW -- A popular packaging feature of many "Electromet" alloys is unit-weight cans and bags. Containing exact weights of alloying elements, these packages provide accurate alloy additions simply by counting out the number of packages required. "Chromtemp" exothermic ferrochrome and "Mantemp" exothermic ferromanganese -- highly efficient ladle addition alloys for open-hearth steels -- are packed in unit-weight cans. So are self-reducing tungsten and self-reducing vanadium, economical alloys for tool and constructional steels. Also, 17 "Electromet" alloys are available in unit-weight bags.

* * *

FORMS PROCESSED IN A VACUUM -- Other alloy forms include bricks and pellets of "Simplex" ferrochrome, a widely used low-carbon ferrochrome for stainless steel. These convenient forms are available because the alloy is vacuum-processed to drive carbon down to extremely low levels. Having the lowest carbon content of any ferrochrome available, the alloy aids stainless melters in meeting low-carbon specifications. Also, "Simplex" ferrochrome penetrates the slag and dissolves readily. As an aid to handling, storage, and inventorying, the bricks are packed in new pre-weighed steel-strapped bundles.

* * *

AT YOUR SERVICE -- Improved alloys and packaging techniques are under constant study at Union Carbide Metals. Experienced materials-handling representatives work directly with metal producers to help determine the most efficient and economical types of alloy packaging and handling in individual plants. Their recommendations on traffic, handling, storage, and usage often result in big savings in money, time, space, or material.

* * *

NATION-WIDE FACILITIES -- To meet the demand for a wide variety of alloys and metals, Union Carbide Metals maintains an efficient warehouse and distribution network to serve metal producers throughout the country. Stocks are maintained at 6 plants and 26 warehouses conveniently located near major metal-producing centers. Rail, truck, barge, and boat shipments speed products to customers' plants. Your Union Carbide Metals representative will be glad to give you further information about the products and services described above. Ask for the article, "Electromet Alloys...When, Where, How You Need Them," in the Winter 1959 issue of UNION CARBIDE METALS REVIEW.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Limited, Toronto.

"Chromtemp," "Electromet," "Mantemp," "Simplex," and "Union Carbide" are registered trade marks of Union Carbide Corporation.

3. Mix is poured around the umbrella; a box holds that part of the hot top which extends above the mold

4. The mixture is tamped lightly in three layers to insure sound structure in the hot tops

discovered that a tapered ingot shoulder eliminates over-rolling and fishtailing when the steel is rolled, reducing the need for cropping.

The electric melt shop at Lukens turns out ingots in 11 sizes. Maximum ingot weight: 15,400 to 102,900 lb. Cast tops made by the chemical bonding process are used or contemplated on all ingots.

The first two umbrellas used at Lukens were purchased through Tholand Inc.; others were made locally, with assistance from Lukens engineers.

• Two-man crews make enough of the hot tops for steel tapped from a 100 ton furnace.

The electric furnace at Lukens melts about 28 heats a week. Two man crews work 15 turns a week to provide hot tops for the pouring pit.

The hot top crew sets the supporting legs of the umbrella at the right height to hold it in the mold. The form can be placed as deep as 42 in. in the mold, or 8 in. from the top. Hot top mix, carried to the mold by a crane, is dumped into the cavity around the umbrella, and tamped.

After gassing and collapse of the umbrella, the hot top can be used immediately.

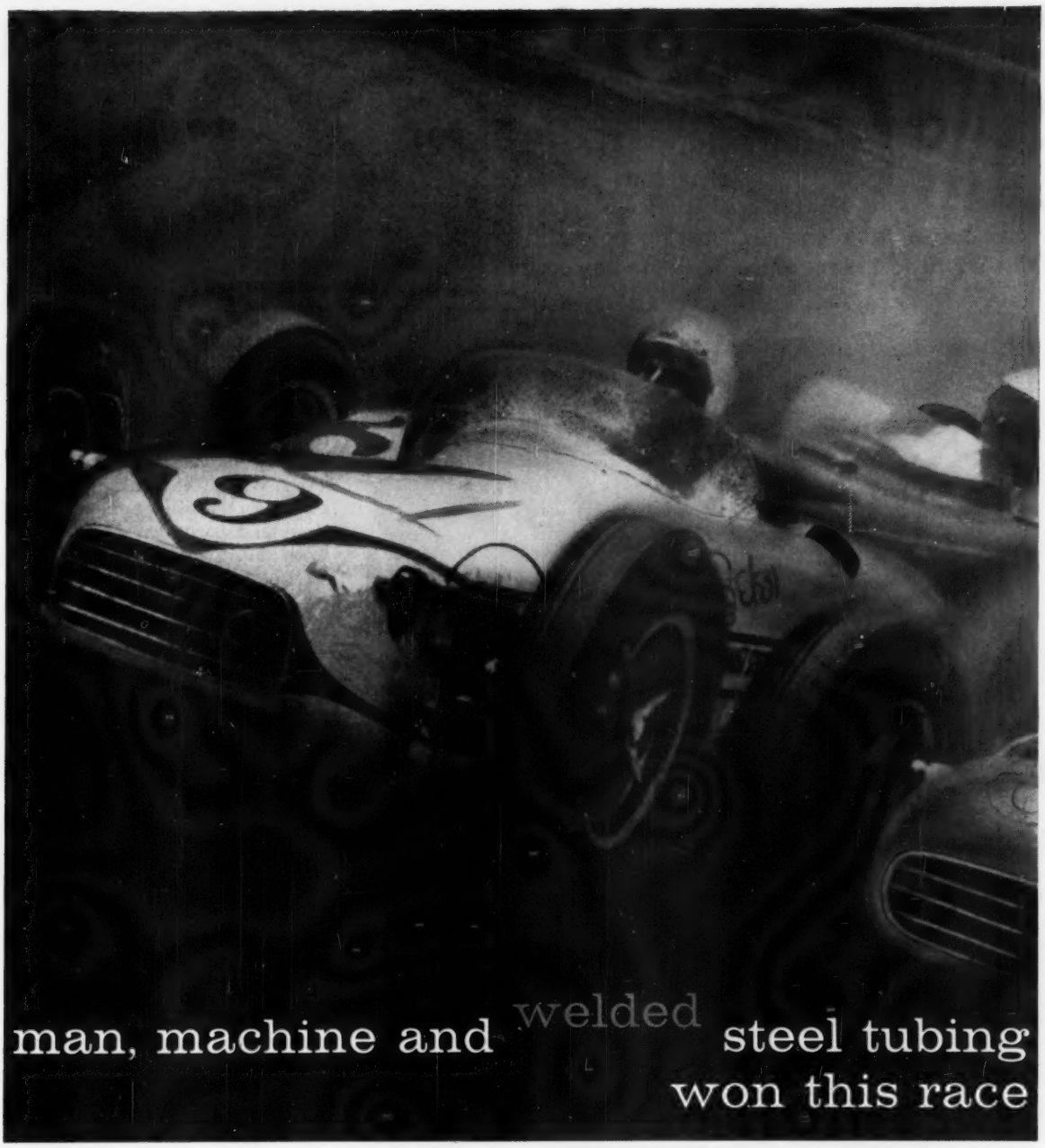
• Lukens is satisfied with the performance of the hot tops in its electric melt shop; the method is being considered for the company's open hearths.

Elimination of collars on ingots decreases cracking and conditioning costs, says Lukens. And improved yield of hot top steel has cut the cost per ton of steel produced.

The tops are said to cost less delivered to the pouring pit than those used previously, in spite of royalties. They don't have to be installed by brickmasons, who can be released for needed furnace rebuilds.

Installation of the tops offers no problems, even in offgage molds. And the short leadtime required makes stocking of tops unnecessary.

5. After application of gas and solidification of the hot top, the pattern is collapsed and withdrawn



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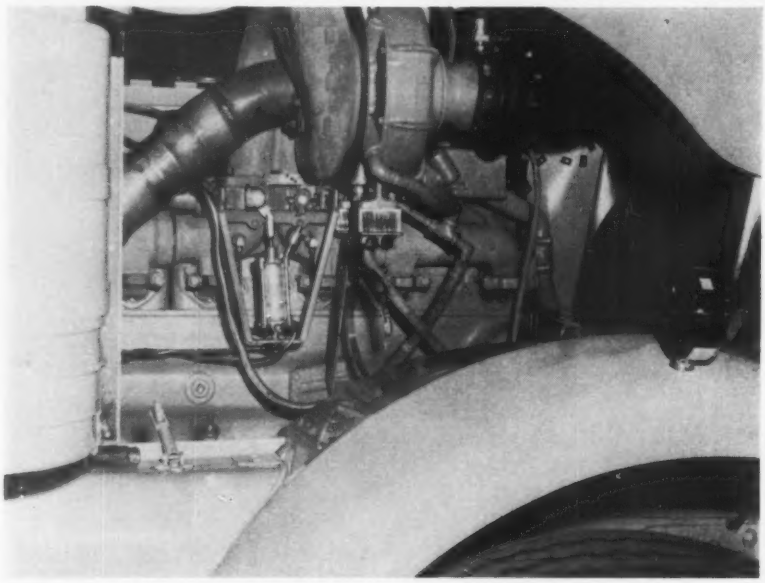
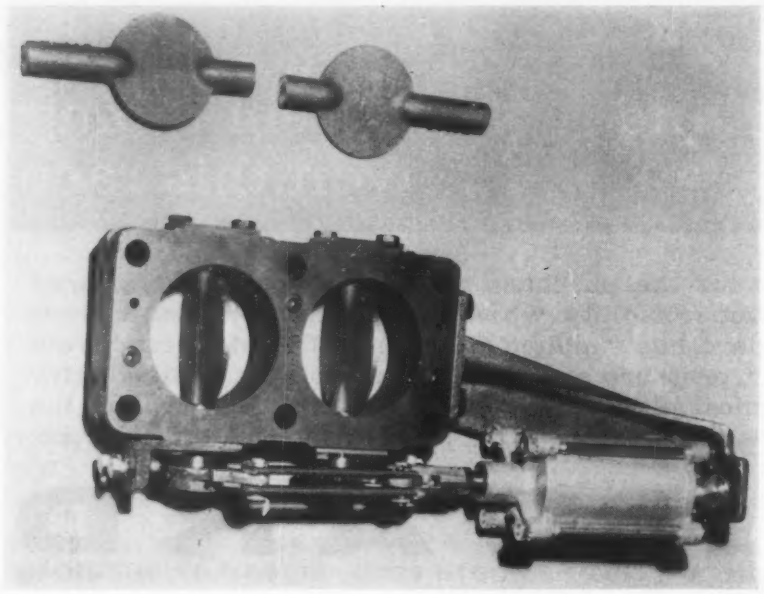
Stainless Alloy Castings Solve Brake Problem

Auxiliary system utilizes back pressure built up in exhaust manifolds of truck engines. Braking power is said to be at least equal to the horsepower of the powerplant



Compression brake is installed on the exhaust side of truck engine, acts by building exhaust pressure



Butterfly valve flappers are cast of HH alloy in shell molds, simplify construction, don't warp under exhaust heat

STAINLESS ALLOY castings have solved problems of warping, leaking, cracking, and corrosion in an auxiliary truck braking device of novel design.

How it operates: Exhaust manifold back pressure is utilized. The system will work with diesel or gasoline motors.

Built by Power Brake Equipment Co., Portland, Oreg., it's called the Williams compression brake.

• **Controls Back Pressure**—An intricately shaped, twin butterfly valve is the heart of the system. Cast from a heat resistant alloy, Alloy Casting Institute Type HH, the valve can be positioned by air or by a mechanical override and lever. When the vehicle descends a grade, the valve automatically closes and begins pressure buildup when the foot is removed from the throttle.

Functioning on the exhaust side of the engine, the brake causes a back pressure of 40 to 50 psi in the exhaust manifold. This forces the engine to function as a compressor, and the retarding force is reported to be at least equal to the engine's horsepower output.

• **Valves Shell Cast**—To reduce the fabricating steps, the valve was cast as a shell molding. The casting is machined only on the stub shafts, to fit the housing bearings.

Use of the casting in the HH alloy also eliminated heat distortion of the valves, which had been a problem with previous materials, the company reports. Yet it is not necessary to give the parts the stress relieving heat treatment formerly employed.

• **Manifold Too**—In heavy duty truck operations, the temperatures in the exhaust manifold may exceed 1350° F, say Power Brake Equipment Co. engineers. So they used the same HH alloy for the drop type manifold, a three piece assembly. Use of the alloy material cuts dimensional changes under heat and stress, assures close fits without pressure loss—both are essential if the brake is to function effectively.

An additional advantage of the alloy, a 25 chrome 12 nickel grade, is its strength (33,000 psi at 1400° F) and good corrosion resistance.

Metal Bonds Fibers Into Strong Composite

Structure that results from combining ceramic with nickel and chromium has high strength and good resistance to heat. Now experimental, it may prove aid to space travel

A METALLURGICAL process that combines ceramic fibers with metal to attain exceptional strengths is described by Horizons Inc., Cleveland process and materials research organization.

Emphasizing that the technique is still in the experimental stage, Dr. Eugene Wainer, vice president and director of research, says it is a potential solution to problems of space travel and ultrahigh temperature resistance.

Metal specifications are best met by an 80 per cent nickel-20 per cent chromium alloy, says Dr. Wainer. The most suitable inorganic fiber is aluminum oxide, of sapphire or corundum single-crystal form. Those fibers are tough and flexible, and can be wrapped around a radius of a fraction of an inch without fear of fracture. More important, about half of the fibers' high tensile strength is retained at the melting point of the nickel-chrome alloy.

Studies on the fiber-metal project began with the increasing demand for high strength alloys suitable for advanced aerospace equipment, to resist intense heat, erosion, and radiation.

• **Like Plastic**—The concept of the method is similar to that of the combination of glass fiber and plastic used for the manufacture of products ranging from fishing rods to rocket nozzles and cones. The strength of such laminates is much beyond that which would be possible by use of the plastic alone.

A similar increase in structural strength would result by combining ceramics with a metal matrix, says Dr. Wainer. Some high temperature fibers available have strengths as high as 3 million psi, although strength of the metal matrix alone could not exceed 500,000 psi. Reinforcement of a metal structure is possible even though the structure is being used close to the metal's melting point.

Dr. Wainer notes a reduction in weight with the fiber and metal combination. Castings compounded from fiber and metal in a 50:50 ratio weigh considerably less than all-metal castings of identical volume.

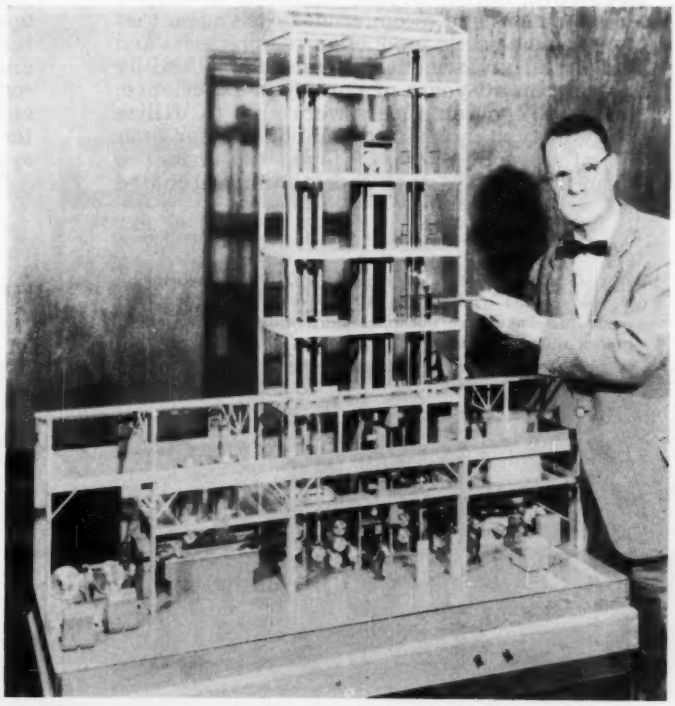
• **Many Materials Studied** — The search for an ideal combination of metal and fibers required examination of numerous alloys and ceramic materials. The metal must exhibit no precipitation phases from alloy combination or heat treating, and must maintain oxidation resistance substantially to the melting point. And the inorganic fiber must be less dense than the metal, have a higher melting point, a coefficient of expansion no more than equal to the matrix, an elastic tension modulus suitably greater than that of the metal, and strength greater than the metal employed.

New Drill Pipe Design

A new drill pipe design is expected to combat the rising cost of oil and gas drilling by increasing the capabilities of present equipment.

Developed by Pittsburgh Steel Co., Pittsburgh, the tapered pipe combines strength and lightness.

The company says: "The concept is aimed at reducing the body weights of pipe for light drilling rigs so that greater depths can be reached with the same hook load."



TOWER TYPE, ELECTRIC ANNEALING FURNACE like this model will be installed at Wallingford Steel Co., Wallingford, Conn., a subsidiary of Allegheny Ludlum Steel Corp. E. B. Cleborne, Wallingford president (pictured), says the furnace will increase the company's output of bright annealed stainless steel strip, used extensively for automotive brightwork (see STEEL, May 9, p. 148)

DESIGN KNOW-HOW PUTS PRODUCTION PLUS IN SHIP LOADING SYSTEM

Barber-Greene solves challenging gypsum handling problem at lowest initial and operating cost

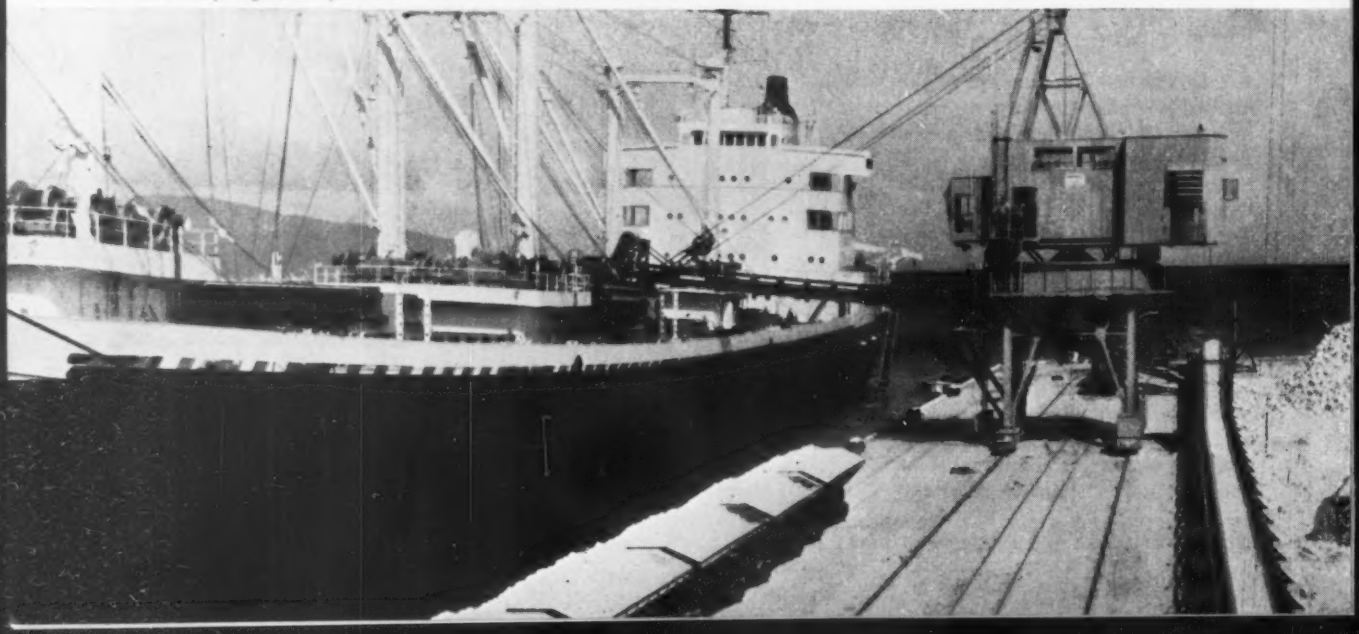
PROBLEM: Design system to unload railroad cars, stockpile 100,000 tons of material in limited area and load ships at Latin American mine and processing plant.

SOLUTION: Barber-Greene engineers developed several designs and recommended the system that met the customer's production requirements and held initial investment to a minimum. And by drawing on 40 years of conveyor experience, Barber-Greene engineers were able to utilize heavy-duty standardized components for over 70% of the job. Operators found the system so dependable and easy to operate that estimated loading time of ships was reduced 25%. Owner benefited two ways: increased production and reduction of shipping costs due to shorter ship loading time charges.

Barber-Greene engineers first made an over-all operational analysis of material handling at both terminal and mine, seven miles away. Such an analysis, an important part of Barber-Greene's service, allowed both customer and engineers to establish present and future requirements and better judge the relative merits of the recommended system.

This customer's satisfaction with his installation

Barber-Greene engineers saved owner $50,000 by revamping old whirly crane as base for 42" conveyor shown loading gypsum reclaimed from stockpiles. Extra wide belt eliminates material spillage on ship.



is best indicated by the fact that he recently placed an order for additional Barber-Greene Conveyors to expand the terminal operation.

Call your Barber-Greene conveyor representative for a sound solution to your bulk material handling problems. He offers the most efficient system that can be provided by engineers equally adept at custom engineering and standardized design. In addition, he offers undivided responsibility for preliminary and final design, fabrication and erection.

Installation at ship loading terminal features a double winged stacker mounted on a traveling tripper which stockpiles in an area 312′ long. Reclaim conveyors under piles direct material to traveling gantry at dock side which loads ships at 675 tph capacity.

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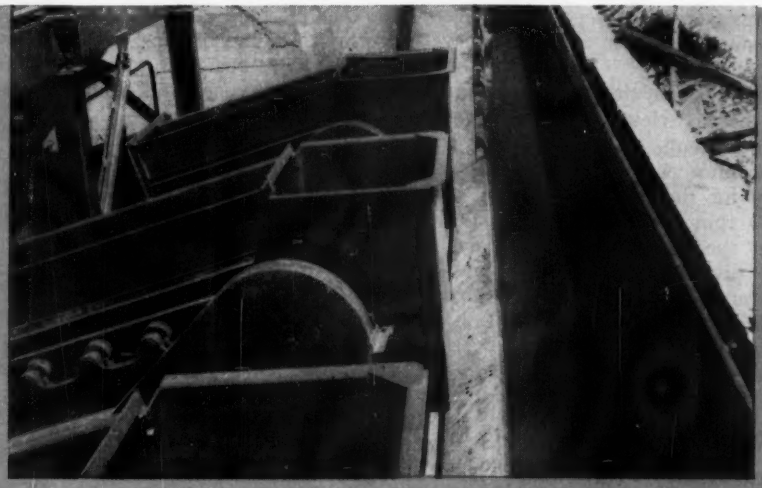

MONEY-SAVING DESIGN: Three 8′ x 8′ hoppers were used to receive gypsum brought to terminal from mine by side-dump rail cars. Single hopper would have been very expensive to construct since water was near ground surface at this point.

This 18,000 rpm grinder replaces a 12,000 rpm unit and produces time and labor savings by keeping speeds up when using a 2 in. cone

High Speed Grinders Speed 50% More Castings on Way

Foundry improves its production, product quality, and customer service as result of program. New equipment will pay for itself in eight months, firm estimates

AN 18,000 RPM grinder is handling at least 50 per cent more work than the 12,000 rpm tool it replaced at Mid-Continent Steel Castings Corp., Shreveport, La. At the same time, it's cutting labor costs in half.

It figures out this way, says K. Jack Easter, cleaning department superintendent: At $2.29 an hour, an operator was paid $1145 annually for the time he handled a 12,000 rpm grinder. So, a single higher speed grinder yields an annual dividend of $572.50—and there are about 30 chippers using grinding tools part time, 10 full time.

Each tool is expected to pay for itself in less than eight months through reduced labor costs.

• **Case History**—The foundry has a monthly capacity of 800 tons of miscellaneous castings (commercial and low alloy steels). In the cleaning department, exacting customer requirements have resulted in small hand grinders being utilized more to reach into housing corners and small valve bodies, to grind irregular shapes, and to work around small curvatures.

The increasing use of small cone wheels made it important to switch to faster tools to maintain production. The resinoid bond grinding wheels employed in the plant can be run up to a surface speed of 9500 feet per minute and every effort is made to stay as close to that maximum as possible.

The first hand grinders in the shop were 4500 rpm tools. Today, 24 Size 4G45 air grinders are in use. With an 8 in. straight organic bonded wheel, the tool provides the desired maximum surface speed on the work the big wheel can reach.

Next, the company tried 16 size 2C1S120 grinders to run 3 and 2 in. cone wheels at 12,000 rpm. With a 2 in. cone the surface speed dropped under 6300 ft per minute. To prevent production slowdowns and loss of operator time, the company selected a higher speed unit (Size 2C1S180). The grinder (rated at 18,000 rpm) is equal in size to the 12,000 rpm tool, but is 50 per cent faster and reaches 9500 sfpm with the 2 in. wheel.

Air Actuated Clutches Boost Press Output

Switching to air actuated clutches on hot heading punch presses has increased production 20 per cent and reduced maintenance costs 80 per cent, reports Voi-Shan Mfg. Co., Culver City, Calif.

Six presses were overhauled and their clutches, brake, and control systems replaced with a standard modernization package produced by Fawick Airflex Div., Fawick Corp., Cleveland. It includes: A constricting type air clutch; a spring engaged, air released brake; high speed electropneumatic controls; and new flywheels with antifriction bearings.

• **Better Control**—The air clutches self-adjust for wear, providing instantaneous torque transmission without repeats or slippage. Push-button control makes setup exact and cycle time precise, contributing to closer tolerances.

A positive safety factor is provided by the spring engaged, air released brake, which is designed to engage in case of electrical or compressed air failure.

• **Maintenance Reduced**—Damaging backlash is eliminated. Starting and stopping are instantaneous. Result: Longer die life and greater machine precision, reducing tool and die and maintenance costs.

Because there is only one moving part (the rubber actuating tube which expands or contracts to engage or disengage the friction shoes with the clutch drum), clutch maintenance is lower. The absence of mechanical linkages, levers, fulcrums, sliding collars or springs, reduces maintenance.

Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

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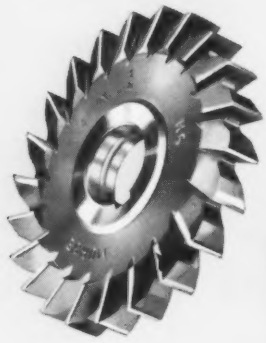

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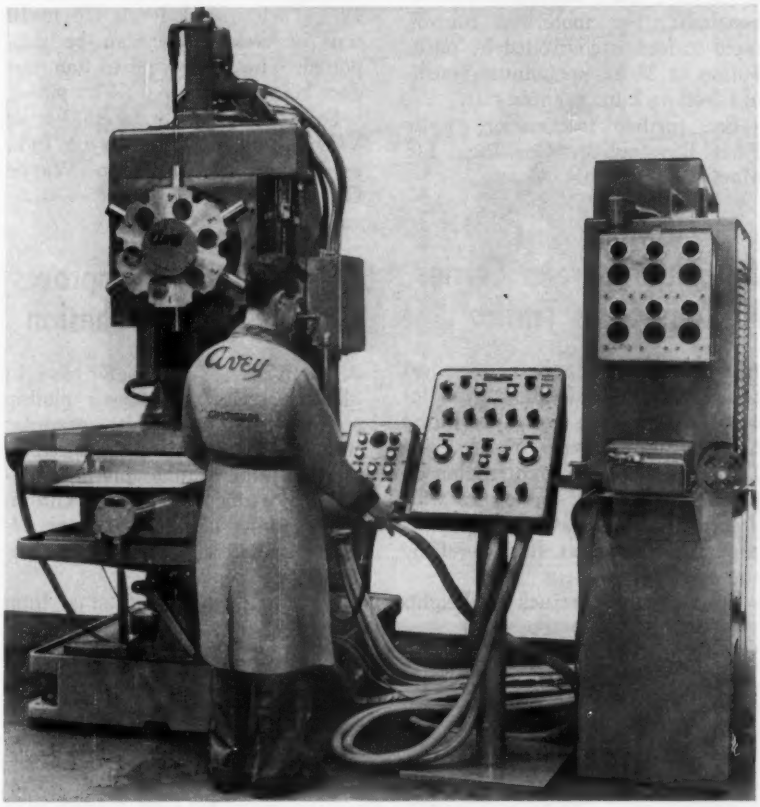
Hydraulic Drilling Unit Has Power Indexed Turret

A HYDRAULIC, six spindle, turret drilling machine has a power indexed turret. At one work position, it can perform operations such as drilling, tapping, reaming, boring, countersinking, chamfering, bottom drilling, and deep hole drilling. Drilling capacity in mild steel is 1¼ in.

Any spindle may be skip indexed. All spindles have automatic depth control with a micrometer adjustment on the depth stops. The infinitely variable feed rate ranges from 0 to 120 ipm. Speeds, feeds, rapid advance, and tapping cycles can be preselected on a panel.

Both turret clamping and push-button indexing of the turret are automatic. The unit has a turret spindle travel of 8 in., rapid traverse rate of 240 ipm, and clearance from spindle to table of 8 to 35 in. Standard table size is 20 x 35 in. Numerical control is available with a two axis positioning table.

For further information, *write* Avey Div., Motch & Merryweather Machinery Co., Box 1264, Cincinnati 1, Ohio.



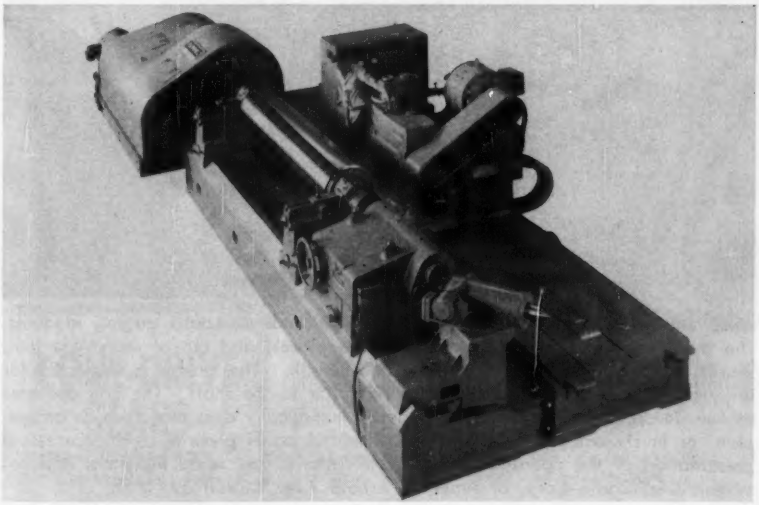
Roll Grinder Handles 20 ft Long Steel Mill Rolls

THIS 60 in. diameter capacity roll grinder is the first of a new design series ranging from 36 to 72 in. in diameter. They will be used for grinding steel mill rolls up to 20 ft long.

Control precision is provided by a newly designed wheel feed system. The unit has a trunnion tilt pivoted, in-feed system with the same wheel feed used in the standard Farrel cam crowning action.

The wheelhead is tilted into the work in the same manner that crowning of the roll is done. Positive in-feed and withdrawal of the grinding wheel can be done accurately.

For manual control, the hand-



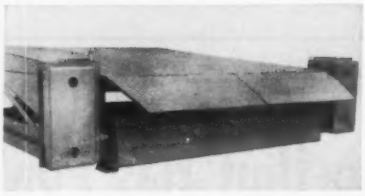
wheel for in-feed is graduated to 0.0001 in. A control stop allows the operator to withdraw the wheel as desired and then in-feed it again to its previous position, smoothly, accurately, and completely without backlash. For motorized control, rapid in-feed is controlled by push-button at 28 in. per minute (medium feed at 2 in. per minute).

For further information, *write* Farrel-Birmingham Co. Inc., 148 Maple St., Ansonia, Conn.

Automatic Leveler Carries 10 Tons Cross Traffic

AUXILIARY hydraulic or electrical power is not needed for an automatic leveler made by Wayne Pump Co. The unit (Model AL-68 Auto-Lip) has a spring counterbalanced platform assembly and comes with a brake and release arrangement that is actuated at floor level by the operator.

It accommodates truck bed heights



from 30 in. above the dock level to 11 in. below dock level. Up to 10 tons of cross traffic can be supported. The unit requires four anchor bolts and fits in a 24 in. pit.

For further information, *write* Wayne Pump Co., Ft. Wayne, Ind., a division of Symington Wayne Corp.

Chrome Reducer Improves Plated Coating Adhesion

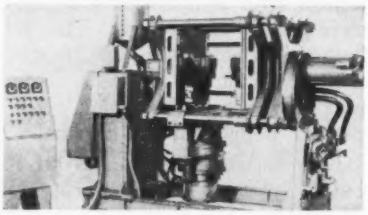
A CHROME reducer for use in alkali cleaners and copper plating solutions is a dry white, granular powder. It's used in soak or electro cleaners and cyanide plating solutions to reduce hexavalent chromium and to eliminate adverse effects of this contaminant on subsequent electroplating.

It also eliminates stains from chrome contaminated cleaners, improves adhesion of the plated coating, extends cleaner life, and permits operation of contaminated copper plating bath until time is available for full chrome removal treatment.

For further information, *write* MacDermid Inc., Waterbury, Conn.

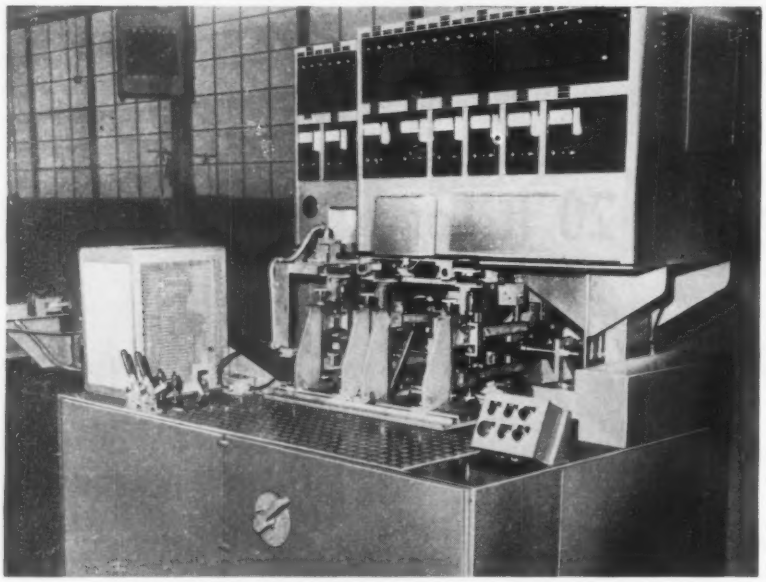
Shell Core Machine Has 90 Second Cycles

A 100 LB CAPACITY, shell core machine is designed for one man operation. It has complete cycles of 90 seconds or less for the production of ready to use precision cores.



It's designed to mass produce large shell cores in single cavity boxes or a wide range of medium size cores in multicavity boxes. All operations (except removal of finished cores from boxes) are fully automatic and variable to meet individual requirements. Platens accommodate coreboxes up to 30 x 24 x 14 in.

For further information, *write* SPO Inc., 6494 Grand Division Ave., Cleveland 25, Ohio.

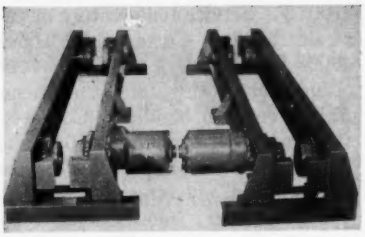


AXLE SHAFT FORGING INSPECTION MACHINE uses standard gaging modules. The machine checks shafts for runout (three places) and out of roundness (two places) as well as outside diameter and length. The flange is inspected for thickness (360 degrees) and runout in reference to the shaft. The unit operates at speeds up to 600 parts per hour and automatically classifies axles as acceptable, or in six categories of rejects. A control panel gives a continuous visual presentation of the operation. For further information, **write** Industrial & Automation Div., Radio Corp. of America, Arnold Ave., Detroit 39, Mich.

Crane Components Rated For 10 Ton Loads

CRANE end trucks and accessories have been designed for users who wish to assemble overhead traveling cranes. All necessary components except the structural steel bridge girder and the driveshaft are supplied.

The company has 18 ratings for spans up to 50 ft. Load capacities range 1 to 10 tons. Light duty models are motor driven and come with top running or underhung construction. They're powered by a head mounted motor on each end truck. The heavy duty models are motor driven, top running and hand geared, top running. Accessories in-



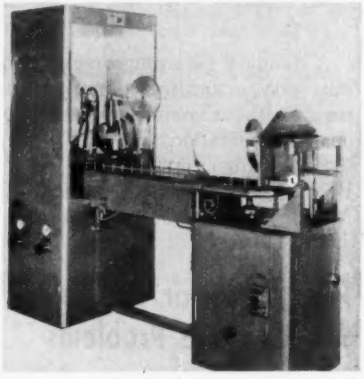
clude magnetic controls, current collectors, and cross shaft bearings and couplings.

For further information, *write* Robbins & Myers Inc., Springfield, Ohio.

Machine Applies Paint To Calibration Markings

APPLICATION of paint and dial fillers to depressed numerals, letters, and calibration markings (with subsequent wiping and polishing) can be done at rates up to 2000 pieces an hour by this machine.

The unit (Model FWP-40) can be loaded with parts such as control knobs, dials, and backlighted instrument signals. They travel into the masking station for application of the filler by automatic spray guns.



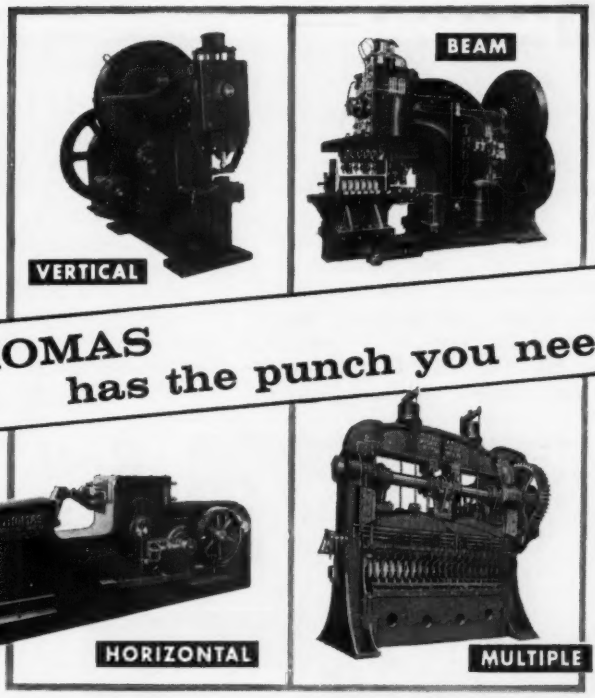
The next station prewipes the excess while it is still wet. The parts can be force dried after the prewipe. Part unloading can be done automatically.

For further information, *write* Conforming Matrix Corp., 345 Factories Bldg., Toledo 2, Ohio.

Two Ceramic Powders Suitable for Hot Tooling

TWO ceramic powders, Corcast and Cortamp, can be formed into shapes used in hot tooling. The first ap-

The trend is to THOMAS



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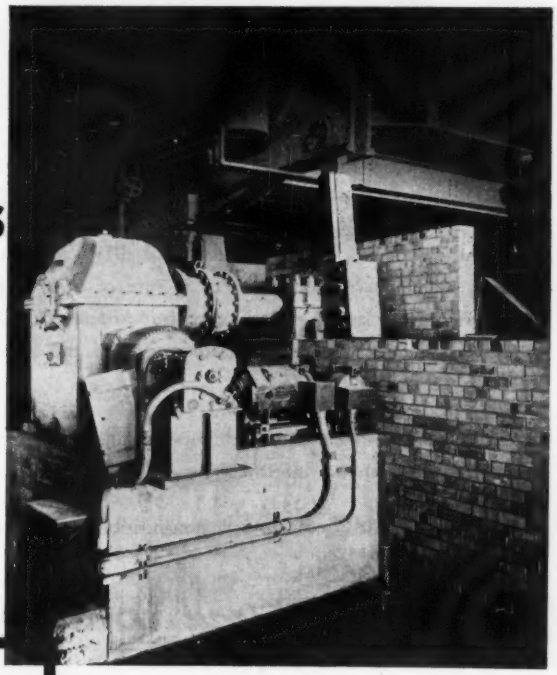
MACHINE MANUFACTURING CO.
PITTSBURGH 33, PA.

Tilting 700-tons of steel furnace



CONE-DRIVE GEARS
DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

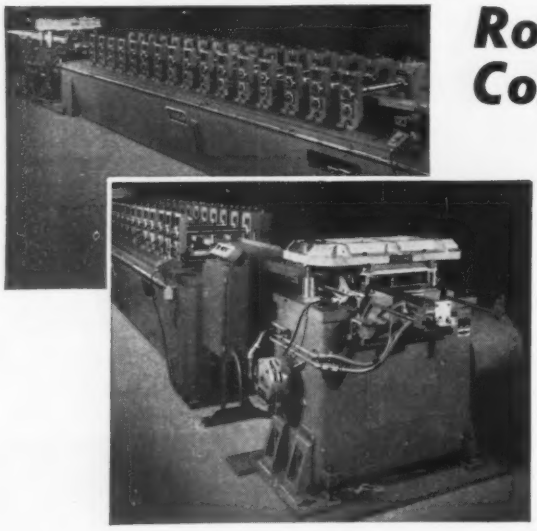
plications will be as tools, jigs, and fixtures in the aircraft and missile industry where shaping of exotic metals requires high heat and pressure.

With the powders, desired shapes can be formed at any time and no separate firing is required. Bonding occurs in use. Temperature capabilities of the material go up to about 2500 and 4000° F. Compressive strengths are high and dimensions remain stable in use.

Shapes in Corcast (a hydraulically bonded petalite) are formed by casting. Drying causes negligible shrinkage and no additional work is required unless grinding is desired. Corcast has a service temperature of about 2500° F. The expansion coefficient is practically zero. It has a compressive strength of 2000 to 3000 psi.

Cortamp is a multibonded zircon formed by compaction. It's held together initially by an organic bond that becomes a chemical bond at 1300° F, and a ceramic bond at 2700° F. Service temperature of ceramic bonded Cortamp is about 4000° F. Shrinkage of 0.03 per cent occurs during the shift from chemical to ceramic bonding. Compressive strength ranges from 10,000 to 12,000 psi. Cortamp pieces can be ground and machined.

For further information, *write* New Products Div., Corning Glass Works, Corning, N. Y.



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Fully coordinated roll forming production lines, such as the above Ardcor installation, produce finished products on a miles-per-day basis.

Here an embossed, aluminum section of .019" stock is being formed by a leading aluminum manufacturer at a rate of 200 ft. per min. An Ardcor Prenotch Press, lower photo, and an Ardcor Cut-Off Press, upper left photo, complement the high performance of the popular Ardcor 1-F Roll Forming Machine.

Ardcor can furnish complete roll forming lines for a wide variety of shapes and sizes—to customer specification.

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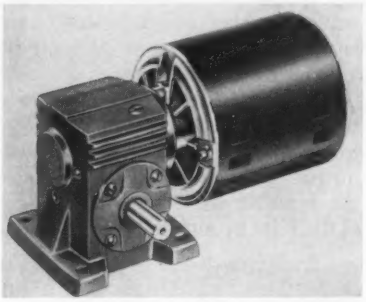
Speed Reducers Powered by 1/20, 0.035 hp Motors

A HORIZONTAL, right angle drive (M109) Ratiomotor is powered by a specially designed 1/20 hp or 0.035 hp motor. It provides a full range of output speeds from 43.8 to 350 rpm.



A standard mounting bracket permits easy mounting in many positions without requiring any mechanical alteration.

For further information, *write* Boston Gear Works, Quincy 71, Mass.

Rust Inhibitor Controls Air Moisture Problems

AN OIL soluble rust inhibitor contains lanolin. It absorbs up to five times its weight in water and eliminates rust forming from air moisture present on the metal when the inhibitor is applied.

It also protects against condensation of moisture caused by temperature fluctuations and neutralizes acids that may be formed by corrosive atmospheres. You can get 16 oz aerosol spray cans, 6 oz cans, and 1 and 5 gal cans.

For further information, *write* Dept. SL-3, Crown Industrial Products Co., 1005 Amsterdam St., Woodstock, Ill.

NEW Literature

Write directly to the company for a copy

Water, Waste Treatment

Technical Reprint T-180 discusses methods and equipment for treating metal finishing process water and wastes. The 12 page article considers recovery vs. disposal and instrumentation of treatment plants for easy operation. Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.

Micrometer Reading

An illustrated sheet discusses micrometer operation, and shows how to read gradations and caliper on a conventional micrometer from thousandths to ten thousandths of an inch. Three examples on calculating reading are included. J. T. Slocomb Co., 68 Matson Hill Rd., South Glastonbury, Conn.

Infrared Source Theories

Technical Bulletin 59-220 discusses infrared source theories and laws, prediction of quantity and quality of radiation from heated sources, color blindness, and other points. Dept. 41, Infrared Div., Fostoria Corp., Fostoria, Ohio.

Blast Furnace Operation

An AISI technical paper, "Predicting Effects of Oxygen, Moisture, and Fuel Additions on Blast Furnace Operation with Electronic Computers," tells how the variable conditions can be reduced to a system of equations which constitute a mathematical model of a blast furnace. When the equations are programed into an electronic computer, effects of a change in the variables can be rapidly and reliably evaluated without furnace tests. Specify Form 1405. Literature Distribution Dept., Linde Co., a division of Union Carbide Corp., 30-20 Thomson Ave., Long Island City, N. Y.

Motor Application Guide

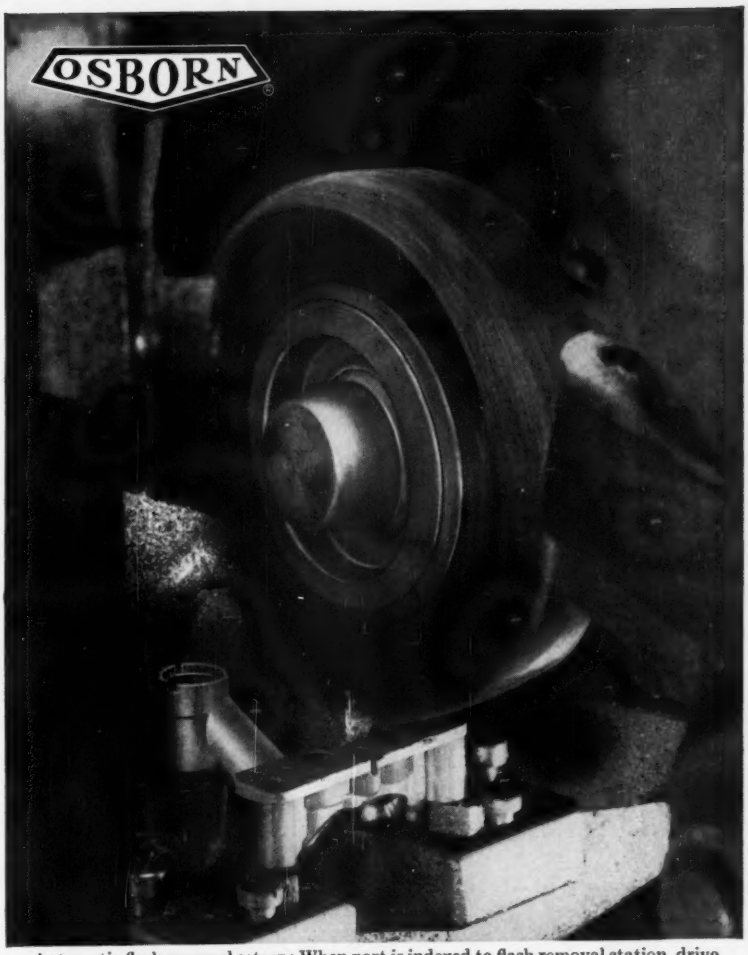
A 15-page bulletin discusses factors in motor selection such as horsepower, speed, frame size, voltage, motor control, and mountings. The booklet (Form 270 B) also discusses gear motors, selective speed drives, and definite purpose motors. Century Electric Co., 1806 Pine St., St. Louis 3, Mo.

Pressure Shaping Metal

Bulletin 500-P4 discusses a metal forming technique: Rotoforming. Cold metal can be pressure shaped into desired thicknesses and circular shapes. Advertising Dept., Commercial Shearing & Stamping Co., 1775 Logan Ave., Youngstown 1, Ohio.

Saw Blade Selection

The selection and use of hacksaw and bandsaw blades for metals, plastics, rubber, wood, and other dense materials are discussed in a 34 page handbook, "Sawology." Nicholson File Co., Providence 1, R. I.



Automatic flash removal set-up: When part is indexed to flash removal station, drive head pivots this Osborn Master® Wheel brush forward and downward to remove die-cast flash effectively, uniformly. Rate: 600 pieces per hour.

Flash removal time cut in half

. . . with Osborn power brushing

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Removing flash from your die-cast parts—especially small, hard-to-handle parts or those with irregular, complex shapes—can be done better, faster and cheaper with Osborn power brushes. In fact, your metal finishing problems of every description—deburring, cleaning, polishing, precision blending—can be solved with advanced Osborn power brushing methods. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first-step toward improved, less costly production. For details, write or phone *The Osborn Manufacturing Company, Department S-23, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

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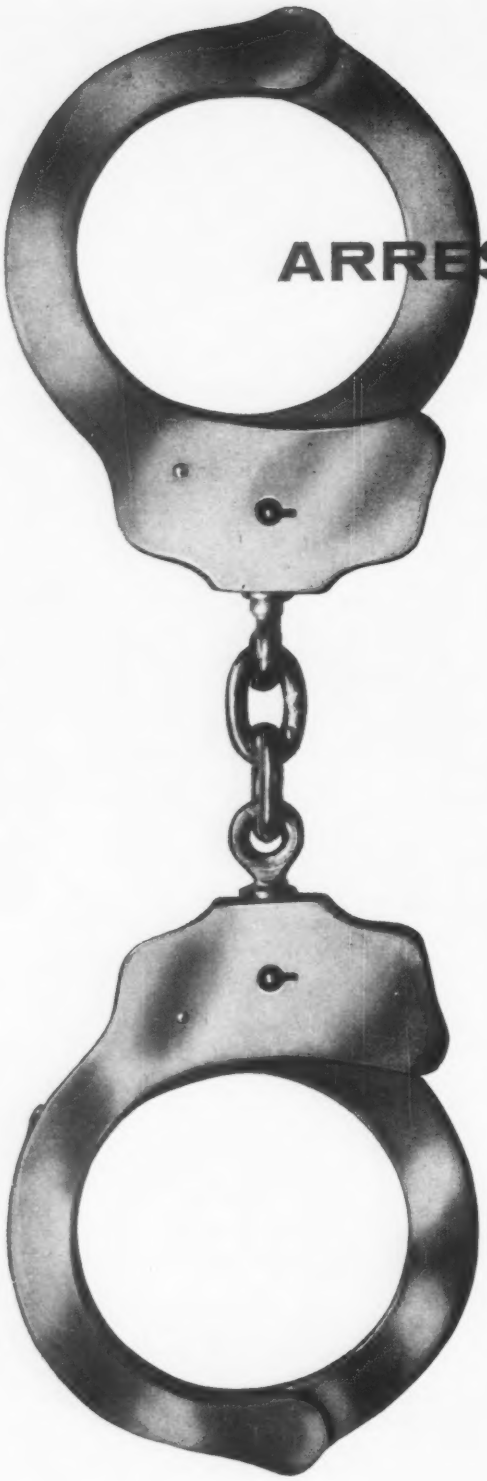
Power, Paint and Maintenance Brushes • Foundry Production Machinery



ARRESTING NEWS FOR THE FASTENER TRADE

. . . and all others who require quality bars and rods!

Though our name is new, Seaway Steel personnel are thoroughly familiar with the needs of the Fastener and Forging trades . . . and this experience extends from front office right straight through our plant and rolling mill.

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SEAWAY STEEL CORPORATION
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Third Quarter Operations: 62%

ALL SIGNS point to a gradual pickup in steel production and shipments. Industry operations will hit bottom this month—possibly within a few days—and then start edging upward. You can expect steelmaking rates to average 55 per cent of capacity in July, 60 per cent in August, and 70 in September. The three-month average will be 62 per cent (vs. 94 in the first quarter and 70 in the second).

LIQUIDATION TO END— The third quarter will be marked by continued liquidation of consumer inventories. By Sept. 30, finished steel stocks will be nearly as low as they were at the start of the year (13.5 million tons). Look for the mills to ship about 16.5 million tons in the next three months—5 million in July, 5.5 million in August, and 6 million in September. Add about 1 million tons of imported steel and domestic consumers will have total third quarter receipts of 17.5 million tons. But they'll use about 20 million.

Stockpiles jumped from 13.5 million to 18.5 million tons in the first quarter and held that peak through April. In May, they declined by 500,000 tons; in June, by 1.5 million. Currently at 16.5 million tons, inventories will drop to 14 million by the end of September.

FOURTH QUARTER UPTURN— Assuming an end to liquidation by Sept. 30, consumers will have to buy as much steel as they use in the fourth quarter. Unless the economy suffers some unexpected setback, there should be a requirement for about 20 million tons. To ship that much finished steel, the industry will have to operate at 75 per cent of capacity. If it does, production will be about 28 million ingot tons (vs. 34.7 million in the first quarter, 26 million in the second, and 23.2 million in the third). On that basis, the year's output will be 112 million ingot tons—fourth largest in the industry's history. Of course, if any significant amount of inventory building occurs in the fourth quarter, the year's total could easily end up at 114 million tons.

STILL OPTIMISTIC— Although they've reduced their estimates of 1960 ingot production, steel leaders still expect a good year. Items:

- Joseph L. Block, chairman of Inland Steel Co., says he will settle for output of 115 million to 118 million tons instead of the 130 million that he predicted last December. He expects second half production of 54 million to 57 million ingot tons, if incoming orders pick up within 30 days.
- C. M. Beeghly, president of Jones & Laughlin Steel Corp., expects 1960 steel consumption to be greater than last year's in all major industries except farm machinery and oil and gas. He believes production will rise at least to the level of consumption by August and predicts that the industry will produce ingot tons "at least equal to the average of the 1955-57 period" (115 million).
- L. S. Hamaker, Republic Steel Corp.'s vice president of sales, predicts an ingot year of 115 million tons. He sees strength in autos (predicts 1960 output of 6.7 million cars—3 million in the second half), private nonresidential construction (requiring 10 per cent more steel than in 1959), and industrial equipment.

PRODUCTION FALTERS— Last week, with the July 4th holiday approaching and nothing to warrant holding production at the previous week's level (61 per cent of capacity), steelmakers cut their operations to 54.8 per cent and melted about 1,560,000 ingot tons. By producing 7.4 million tons in June, they brought their first half output to 60.8 million tons (vs. 64.3 million in the like period of 1959).

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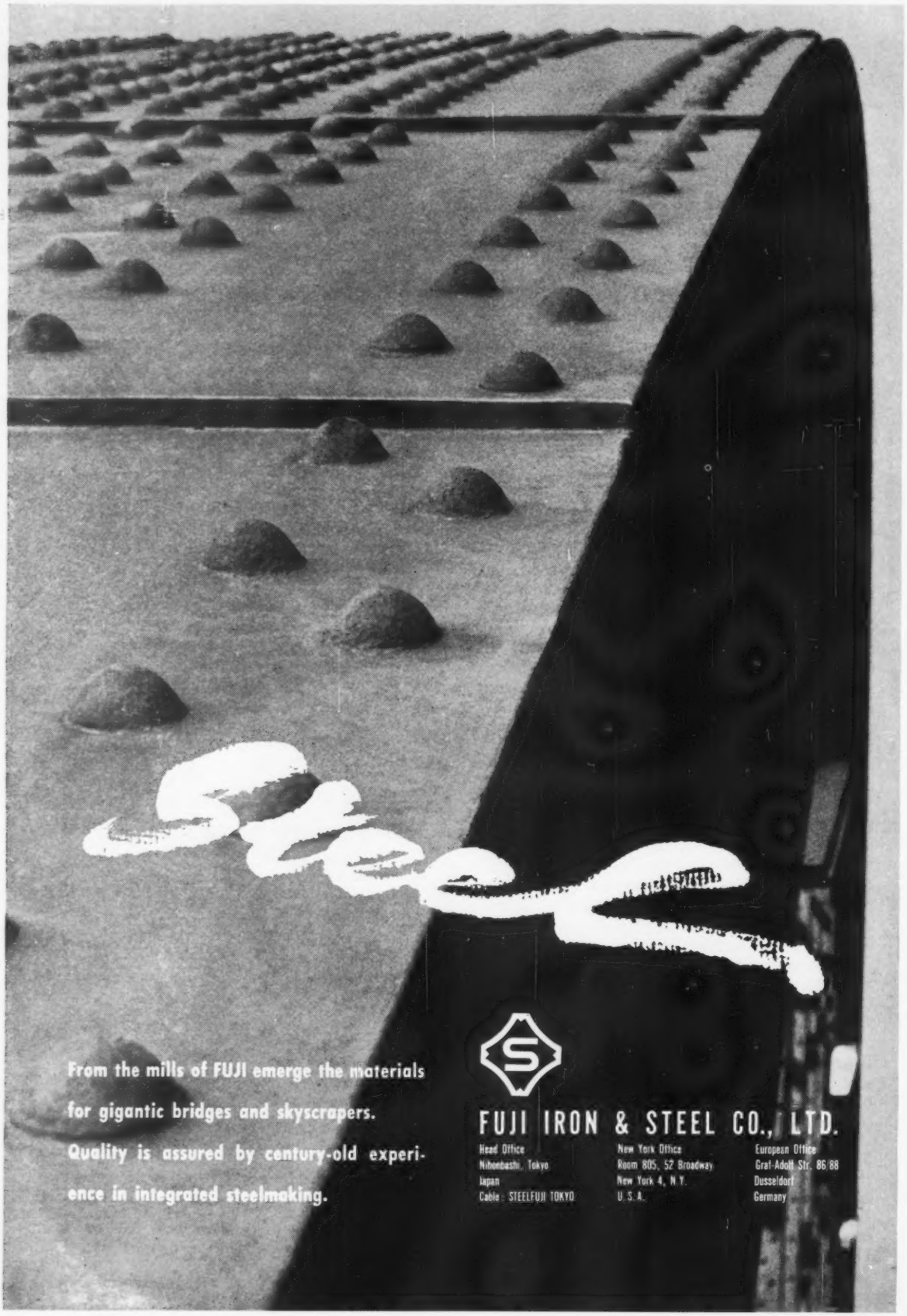
*Current prices were published in the June 27 issue and will appear in subsequent issues.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STEEL
QUARTERLY SURVEY

COMPONENTS	CURRENT INVENTORIES					3rd Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
CASTINGS . . . . . Die, grey iron, malleable, nonferrous, steel.	1%	17%	66%	14%	2%	35%	58%	7%
OTHER FORMED COMPONENTS . . . . Forgings, stampings, springs, wire shapes.	3%	10%	55%	24%	8%	39%	57%	4%
MACHINED COMPONENTS . . . . . Bearings, couplings, cylinders, gears, screw machine products.	3%	16%	47%	27%	7%	31%	61%	8%
ELECTRICAL EQUIPMENT, MOTORS . .	7%	28%	43%	13%	9%	29%	62%	9%
FASTENERS	2%	28%	48%	16%	6%	32%	65%	3%
MECHANICAL RUBBER GOODS, BELTING	4%	25%	49%	20%	2%	35%	60%	5%

FIGURES are percentages of respondents to STEEL's quarterly survey. UNDERSCORED figures show how most respondents reported.

Brakes on Part Buying Hold Fast

Buyers plan lower inventory levels for September as purchasing slowdown continues. Delivery complaints drop as 21 per cent of STEEL's respondents report overstocks

COMPONENT BUYERS are applying more pressure to the inventory brake pedal they started to push about three months ago. Although a slight upturn in business was noted by many companies in the second quarter, 33 per cent of the respondents to STEEL's quarterly survey of component buyers plan to have reduced reserves three months from now. That's nearly 10 percentage points above the second quarter figure. Only 7 per cent foresee an inventory buildup.

● **Tighter Control** — Closer inventory control, as noted by STEEL earlier in the year, is playing a major part in the stock leveling. About 23 per cent of the purchasing agents say stocks are lower than they were at the same time last quarter. Eleven per cent say they are higher.

A general decline was registered in the 60 day and over categories. The pattern under 30 days was mixed. A buildup of all products in the 30 to 60 day period occurred, indicating the elimination of most of the spot shortages which plagued buyers in the second quarter, despite the general overstock trend.

Delivery problems continue to decline. Of the respondents, 24 per cent complained of such difficulties, an 11 percentage point drop from the last survey (see STEEL, Apr. 4, p. 177). Electrical goods are causing the most problems, with bearings and castings also mentioned.

● **Stocks Balanced**—The inventory breakdown shows stocks are well balanced: 3 per cent under 10 days' supply; 19 per cent in the 10 to 30 day category; 53 per cent at the 30 to 60 day level; 19 per cent in the 60 to 90 category; 6 per cent over three months.

Reserves are still higher than 36 per cent of the purchasing agents had expected them to be at this time. The same situation was true three months ago. Only 11 per cent are lower than planned.

Nearly 21 per cent of the respondents report overstocks, about the same number that registered such complaints in the last survey. Castings were most frequently mentioned as being in great abundance.

Steel Bars . . .

Bar Prices, Page 100

Orders for hot rolled carbon steel bars are diversified, but they continue in light volume. Shipments are available in two to four weeks. At the same time, cold drawn carbon bars are readily available. Most converters have good inventories of

hot stock, and in some cases, they hold fair stocks of cold finished bars ready for immediate shipment. Both hot and cold alloy bars are offered by the mills for nearby delivery.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 101 & 102

Sheet business continues to lag, but the automotive industry has placed some attractive orders for July shipment, and has made even better commitments for August. The tonnages are mostly for the 1961 models. In general, with orders fluctuating from week to week, the feeling is there won't be much pickup in buying until late July or early August.

In the Midwest, June orders were estimated down about 10 per cent from May's volume. New orders from March to date have been on a fairly level plane in the area, but rising cancellations whittled down the net order picture.

July promises to be the slowest month of the year, with new orders lagging behind shipments at most mills. Curtailed mill operations over the next few weeks should result in some buildup of order backlogs.

Hot rolled sheet deliveries can be made in two to three weeks. Cold rolled sheets can be had in three to four weeks (if bands are available), and in five to six weeks if it's necessary to process work from the beginning.

Tubular Goods . . .

Tubular Goods Prices, Page 104

Sluggish demand for tubular goods continues. Oil country requirements are depressed, and building needs are disappointing, though a large volume of construction is scheduled for this summer.

Commercial pipe is being offered by producers for delivery within 10 to 12 days. In some instances, tonnage is available for prompt shipment. Distributors' inventories continue heavy.

Active rotary oil drilling rigs totaled 1927 in the week ended June 20, reports Hughes Tool Co. In the preceding week, the total was 1935, and in the same week a year ago, it was 2436.

Major oil companies have been placing some fairly substantial orders for tubing and casing, but there's no over-all pattern of improvement. In an effort to generate business, tubemakers are staging concentrated sales drives. Mill inventories of finished pipe are so extensive, they can ship 95 per cent of the orders they receive within three days. June shipments were no better than those in the previous month.

Tin Plate . . .

Tin Plate Prices, Page 203

Following the lead of U. S. Steel Corp., other producers of tin plate have revised their schedules of extras and deductions (see STEEL, June 27, p. 126). The changes, designed to make tin plate more competitive with other materials, result in a price reduction of about 4 per cent on some of the lowest basis weight items.

Stainless Steel . . .

Stainless Steel Prices, Page 104

Since demand bottomed out in April, new orders for stainless steel have been slowly trending upward. Demand, though, still lacks vitality. June bookings were only 5 to 10 per cent better than April's. Producers are hoping for a substantial improvement early this month as automakers place tonnage for the 1961 model cars.

Despite the 1-million-car inventory of unsold 1960 models in dealers' showrooms, the auto builders will have to start production of next year's models in August. The steelmakers are hoping that the compacts to be introduced by GM's Buick, Oldsmobile, and Pontiac divisions will have more stainless trim than the small cars that were brought out last year.

The Navy has placed four contracts for stainless and alloy sheets, totaling 503 tons. George J. Strober Co. Inc., Brooklyn, N. Y., booked two of the contracts, involving 430 tons.

Wire . . .

Wire Prices, Pages, 102 & 103

Wiremakers anticipate no marked improvement in demand until August. By that time, it's thought, the automakers should be actively specifying requirements for the 1961 model cars. Manufacturers' wire is available for delivery within two weeks, and merchant wire can be had for shipment from stock.

Most wiremakers curtailed operations over the holiday, and some will be slow to resume the preholiday production pace because of vacation schedules.

Plates . . .

Plate Prices, Page 100

While demand for plates continues slow, prospects are slightly better for a pickup in shipyard demand now that the five month strike at eight Eastern yards of Bethlehem Steel Co. has been settled. Also, award of a 10,500 dead weight ton ship for Moore-McCormack to Sun Shipbuilding & Dry Dock Co., Chester, Pa., gives the market a nudge.

Sun Shipbuilding has also booked 10,885 tons of cable anchorage metalwork for the Verrazano-Narrows Bridge, New York. The job includes about 8000 tons of I-bars, which will be cut from plates.

With resumption of operations at Bethlehem's yards, more tonnage will be estimated for the Navy's 1961 construction program, to be bid later this year. The Bath, Maine, yard will go for seven ships (two destroyers, three frigates, and two ocean escorts).

Distributors . . .

Prices, Page 105

Recent trading at steel service centers has held up a little better than anticipated. It now appears that June business held even with that of May.

One distributor in the Philadelphia district estimates his business was up 5 to 10 per cent. He ascribes the improvement primarily to purchases for maintenance and repair programs which many metalworking shops have scheduled while closed for mass vacations. But the business probably will be at the expense of bookings in July, which may be the slowest month this year.

The price tone is weak in most areas. Joseph T. Ryerson & Son Inc. has revised price schedules in St. Louis; other distributors will probably take similar action to remain competitive. The pricing pattern had been established in Chicago, Cleveland, Pittsburgh, and several other centers. Some prices are somewhat higher on slow moving items, including large structurals; lower on fast moving items, including bars and light plates.

Shipments of Tin Cans Increase in April

Tin can shipments in April totaled 362,850 tons vs. 330,034 in March, this year, and 386,738 in April, 1959, reports the U. S. Census Bureau. The total for the first four months this year was 1,281,749 tons vs. 1,345,763 in the like period last year.

Shipments of fruit and fruit juice cans amounted to 45,122 tons in April, while vegetable and vegetable juice cans totaled 43,055 tons. In March, fruit and fruit juice cans totaled 39,960 tons and vegetable and vegetable juice cans, 32,556 tons. In April, 1959, fruit, fruit juice cans, and vegetable and vegetable juice cans totaled 93,995 tons.

Shipment of fruit and fruit juice cans in the first four months this year amounted to 179,039 tons, and vegetable and vegetable juice cans, 125,928 tons, for a total of 304,967 tons. In the same period last year, the total was 311,534 tons.

Beer can shipments in April amounted to 72,888 tons vs. 62,691 in March, this year, and 77,048 in April, 1959. The total in the first four months was 226,846 vs. 242,720 a year ago.

Pig Iron . . .

Pig Iron Prices, Page 105

Demand for merchant iron continues to taper as foundries prepare for vacation shutdowns. No appreciable pickup is likely to develop until late August. The July melt is expected to drop to the year's low.

Because of the slump in business, curtailment of operations by the steel industry over the July 4 holiday will be the sharpest in recent years. The situation in Chicago is typical. With the idling of three blast furnaces, only 24 of the district's 43 stacks are active—the smallest number in operation since July, 1958, when 23 were running.

Everett, Mass., has ceased to be a basing point for pig iron because stocks of metal at the Mystic furnace have been liquidated. The basing point for iron shipped to Boston and surrounding areas is Troy, N. Y. Boston delivered prices are: $75.20 for basic, $75.70 for No. 2 foundry, $76.20 for malleable, and $76.70 for bessemer.

Semifinished Steel . . .

Semifinished Prices, Page 100

Steelmaking operations slumped sharply last week, dropping to 54.8 per cent of capacity from 61 per cent the preceding week. The rate is the lowest since July, 1958, excluding the strike period last year.

Last week's production was estimated at 1,560,000 net tons compared with 1,739,000 the preceding week, 1,726,000 a month ago, and 2,215,000 a year ago.

Most of the mills went down over the Fourth of July holiday, and some of them extended the suspension beyond the normal holiday period. A number of steelmakers are scheduling shutdowns for mass vacations this week, which may result in a still lower ingot rate.

Structural Shapes . . .

Structural Shape Prices, Page 100

May structural steel bookings of 269,941 tons were off from April's 344,944 tons but were 12 per cent better than the 241,612 tons in May, 1959. The total for the first five months, 1960, was 1,467,791 tons, about 146,000 more than in the like 1959 period.

Shipments of 284,579 tons in May were off slightly from the 286,884 moved in April and were down 3 per cent from the 294,127 tons shipped in May, last year. The total for the first five months was 1,298,321 tons, up 1 per cent from the 1,285,627 tons shipped in the same period, 1959.

Backlogs as of May 31 were 2,237,357 tons, of which 1,298,942 tons were scheduled for fabrication during the four months ending Sept. 30.

The market is experiencing a slight demand flurry. Several sizable jobs have been placed, and a number are actively pending. Sun Shipbuilding & Dry Dock Co., Chester, Pa., booked 10,885 tons for cable anchorage metalwork on the Verrazano-Narrows Bridge, New York. Harris Structural Steel Co., New York, was awarded 6800 tons for the New York Port Authority bus terminal in New York. Harris also

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ready to ship within two weeks. The **Sendzimir Mill** material you want exactly as you want it, **when you want it.** Gauges stocked are:

.0015 .002 .005 .010

in the following types of steel: T310, T321, T347, T410, 17-7 P.H. Condition A **(hydrogen annealed).** AM350, A286, 19-9 DX, Inconel, Inconel X, and L605. Other gauges rolled to order within four weeks. Slit as narrow as .032 (1/32") wide.

Certified ANALYSIS can be given on any Ulbrich material

SINCE 1924
Ulbrich
"the biggest little mill in the country"

STAINLESS STEELS
WALLINGFORD, CONN.
Phone: COlony 9-1434
TWX Wallingford, Conn. 277

booked 4000 tons for a 32 story office building for the Mid-City Realty Corp. at 555 Madison Ave., New York, N. Y.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,885 tons, cable anchorage metalwork, Verrazano-Narrows Bridge, New York, for Triborough Bridge & Tunnel Authority, to Sun Shipbuilding & Dry Dock Co., Chester, Pa.

6800 tons, bus terminal, Port Authority of New York, 41st St. and 8th Ave., New York, through Starrett Bros. & Eken Inc., general contractor, to Harris Structural Steel Co., New York.

4000 tons, missile complex facilities, U. S. Army Engineers, Plattsburg, N. Y., through Raymond Concrete Pile Co., contractor, to the American Bridge Div., U. S. Steel Corp., Pittsburgh; 14,000 tons of reinforcing steel for same project to Joseph T. Ryerson & Son Inc., Chicago.

2850 tons, welded steel girder spans, Lake Charles bypass, Calcasieu River Bridge, Calcasieu Parish, Louisiana, to U. S. Steel Corp., Pittsburgh.

2500 tons, penstocks and accessories, Clear Creek and Trinity powerplants, Central Valley project, California, to U. S. Steel Corp., Pittsburgh; bids to the U. S. Bureau of Reclamation, Denver.

1535 tons, pharmaceutical building, No. 13, Schering Corp., Union, N. J., through Walter Kidde Constructors Inc., New York, to Elizabeth Iron Works Inc., Union, N. J.

950 tons, Yellowstone River bridge, Montana, to Pacific Coast Div., Bethlehem Steel Co., Seattle; W. R. Cahoon Construction Co., Pocatello, Idaho, general contractor, at $808,983.

900 tons, 138 transmission towers, American Electric Power Co., Ft. Wayne, Ind., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

510 tons, state bridgework, Route 95, sec. 1-D, Englewood, N. J., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

450 tons, E. C. Goodwin Vocational School, Hartford, Conn., to Standard Structural Steel Co., Hartford; Associated Construction Co., Hartford, general contractor.

375 tons, including concrete reinforcing bars, Mt. Greylock Regional High School, Williamstown, Mass., to Haarmann Structural Steel Co., Holyoke, Mass. (structurals), and Mohawk Steel Co., Albany, N. Y. (reinforcing bars); George F. Emerson Inc., Pittsfield, Mass., general contractor.

374 tons, Providence Hospital, Anchorage, Alaska, to United Concrete Pipe Corp., Auburn, Wash.; Patti-MacDonald Construction Co., Seattle, general contractor.

STRUCTURAL STEEL PENDING

12,000 tons, state highway project, Bronx County, New York; Bethlehem Steel Co., Bethlehem, Pa., low bidder through Berlanti Construction Co. and Zazzarino Construction Corp., joint low on the general contract.

4350 tons, bridge, Cabin John, Md., Ruckman & Hansen and Roy Ryan & Sons, Dayton, Ohio, low on the general contract on a joint bid.

4000 tons, estimated, office building, New York Life Insurance Co., New York.

2430 tons, towers, New Jersey Power & Light Co., Whippany, N. J.; bids July 15.

2004 tons, (government furnished) Schedule IV, Rocky Reach-Maple Valley, 16.6 mile, 345 kv transmission line, involving 75 tower bodies and extensions; Tyee Construction Co., Beaverton, Oreg., low at $746,835 to Bonneville Power Administration, Portland, Oreg.

1800 tons, Black Medical Research Bldg., College of Physicians & Surgeons, New York; Walter Kidde Constructors Inc., New York, engineer and contractor.

1685 tons (government furnished), Schedule II, Big Eddy-McLoughlin, 15.4 mile transmission line, Hood River and Clackamas counties, Oregon; Charles T. Parker Co., Portland, Oreg., low at $408,972 to Bonneville Power Administration, Portland; involving 66 tower bodies.

1500 tons, plant and laboratory, Yardley of London, Totowa, N. J.; bids asked.

1000 tons or more, project No. 6, Port Mann Bridge, Fraser River, British Columbia; Western Bridge & Steel Fabricators Ltd., Vancouver, B. C., low at $3,583,698 to provincial department, Victoria, B. C.

1000 tons, municipal pier 39, Brooklyn, N. Y.; bids July 20.

750 tons, District of Columbia filter and chemical building, Washington; Noraire Engineering Co., Washington, low on the general contract.

650 tons, research center, Warner Lambert, Morris Plains, N. J.; Water Kidde Constructors Inc., New York.

500 tons, Institute for Crippled & Disabled, New York; Starrett Bros. & Eken Inc., New York, general contractor.

400 tons, state bridge, Wicomico, Md.; bids July 15.

308 tons, state highway bridge, FIMIE 60-2, Niagara County, New York; bids July 14.

REINFORCING BARS . . .

REINFORCING BARS PLACED

14,000 tons, missile complex facilities, U. S. Army Engineers, Plattsburg, N. Y., to Joseph T. Ryerson & Son Inc., Chicago; 3000 tons were placed through the Raymond Concrete Pile Co. to the American Bridge Div., U. S. Steel Corp., Pittsburgh.

752 tons, mostly 40 ft lengths, U. S. Engineers, San Francisco, to the Oregon Steel Mills Div., Gilmore Steel Corp., Portland, Oreg.

625 tons, Tapley post office annex, Springfield, Mass., to H. L. Foster Co. Inc., Springfield; Ley Construction Co., Springfield, general contractor.

380 tons, addition to Virginia Mason Hospital, Seattle, to the Pacific Coast Div., Bethlehem Steel Co., Seattle; Baugh Construction Co., Seattle, general contractor.

312 tons, dormitories, group 2, Dartmouth College, Hanover, N. H., to Scherer Steel Co., East Hartford, Conn.; Wexler Construction Co., Newton Highlands, Mass., general contractor.

200 tons, E. C. Goodwin Vocational School, Hartford, Conn., to Scherer Steel Co., East Hartford, Conn.; Associated Construction Co., Hartford, general contractor.

187 tons, highway bridge, Pierce County, Wash., to Pacific Coast Div., Bethlehem Steel Co., Seattle; Puget Construction Co., Seattle, general contractor.

185 tons, air control center, Auburn, Wash., to Pacific Coast Div., Bethlehem Steel Co., Seattle; Baugh Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

985 tons, Washington State, Vantage Bridge understructure, bids postponed from July 6 to July 12 at Olympia, Wash.

115 tons, Washington State, girder overpass, King County; Harry Hawkins, Seattle, awarded at $128,367.

PLATES . . .

PLATES PLACED

700 tons, pipe piling for Nikolski, Alaska, oil terminal, to Hydraulic Supply Mfg. Co., Seattle.

450 tons, watertank, Ellensburg, Wash., to Chicago Bridge & Iron Co., Seattle.

100 tons or more, armor plate, Aberdeen Proving Ground, Maryland, to Lukens Steel Co., Coatesville, Pa., $235,590; Midvale-Heppenstall Co., Philadelphia, $161,759, and U. S. Steel Corp., Pittsburgh, $101,795.

100 tons, floating roof fuel storage tank, Eglin AFB, Florida, to Chicago Bridge & Iron Co., Chicago.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chesapeake & Ohio, 200, seventy-ton boxcars and 150, seventy-ton insulated boxcars to its Russell shops.

Union Tank Car Co., twelve, 30,000 gallon tankcars, to its own shops at Whiting, Ind.

Grand Trunk Western, 75, seventy-ton flatcars to Ortner Co., Cincinnati.

Trailer Train Co., 500 piggyback flatcars, with 250 going to ACF Industries Inc., New York, 150 to Pullman Standard Div., Pullman Inc., Chicago, and 100 to Bethlehem Steel Co., Johnstown, Pa.

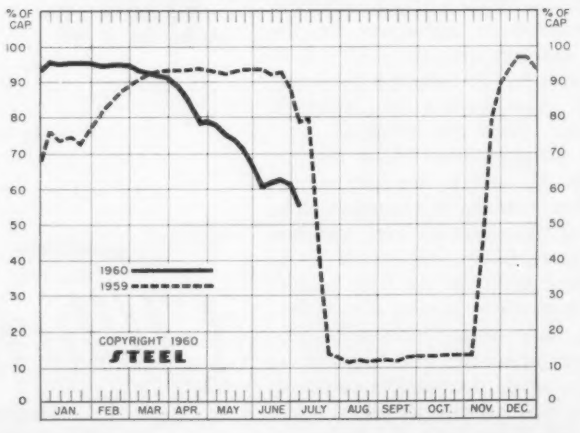
DISTRICT INGOT RATES

(Percentage of capacity utilized)

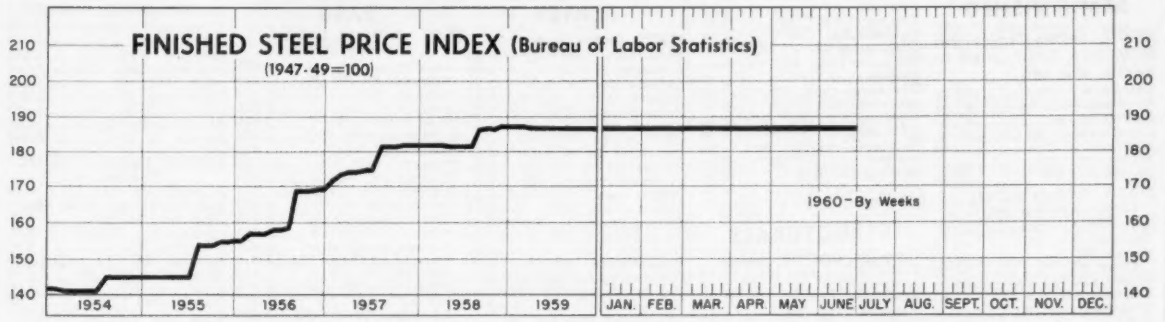
	Week Ended July 3	Week Ago	Month Ago	Year Ago
Northeastern	61	69	64	77
Buffalo	55	61	69	84
Pittsburgh	48	59	61	77
Youngstown	42	46	27	72
Cleveland	59	64	64	54
Detroit	82	80	81	84
Chicago	54	63	68	86
Cincinnati	50	54	60	72
St. Louis	61	63	77	104
Southern	62	63	54	82
Western	63	63	63	81
Total Industry..	54.8	61.0	60.6	78.2
Index ..... (1947-49=100)	97.1	108.3	107.4	137.9
Net Tons ..... (In thousands)	1,560	1,739	1,726	2,215

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



June 28, 1960	Week Ago	Month Ago	May Index	Year Ago
186.6	186.6	186.6	186.8	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 28

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H. R. Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.767
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.875
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.647
		Nails, Wire, 8d Common	9.488
		Wire, Barbed (80-rod spool)	8.414
		Woven Wire Fence (20-rod roll)	20.003

STEEL'S FINISHED PRICE INDEX*

	June 29 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.63
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$118.45
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	31.33	31.33	32.00	36.83	36.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	June 29 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H. R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, 7/32-9/32" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	June 29 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$30.50	$30.50	$33.50	$36.50	$35.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	35.00	38.00	39.00
No. 1 Heavy Melt, Chicago	29.50	29.50	30.50	36.00	35.00
No. 1 Heavy Melt, Valley	32.50	32.50	32.50	41.50	37.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	31.50	38.50	35.00
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	33.50	29.50
Rails, Rerolling, Chicago	49.50	49.50	52.50	59.50	52.50
No. 1 Cast, Chicago	40.50	40.50	42.50	52.50	42.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

Steel Prices

Mill prices as reported to STEEL, June 29, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 101, footnotes, page 103.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 .....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburgh,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
Los Angeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill.U5, W14..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2...7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2...7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ....5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ....5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'e'go(9)R2,U5 W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ...5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay, Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind.J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025

Waukegan, Ill. A7 ....9.025
Willimantic, Conn. J5 ..9.325
Worcester, Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Alabama City, Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse, Mich. G5 .....5.675
Emeryville, Calif. J7 ...6.425
Fairfield, Ala. T2 .....5.675
Fairless, Pa. U5 .....5.825
Fontana, Calif. K1 ....6.375
Ft. Worth, Tex. (26) T4 5.25
Gary, Ind. U5 .....5.675
Houston S5 .....5.925
Ind. Harbor, Ind. I-2, Y1 5.675
Johnstown, Pa. B2 ...5.675
Joliet, Ill. P22 .....5.675
Kansas City, Mo. S5 ...5.925
Kokomo, Ind. C16 ....5.775
Lackawanna, N.Y. B2 ..5.675
Los Angeles B3 .....6.375
Madison, Ill. L1 .....5.875
Milton, Pa. M18 .....5.825
Minnequa, Colo. C10 ..6.125
Niles, Calif. P1 .....6.375
Pittsburg, Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 ...6.425
Sand Springs, Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S. Chicago, Ill. R2, W14 5.675
S. Duquesne, Pa. U5 ...5.675
S. San Francisco B3 ....6.425
Sparrows Point, Md. B2 ..5.675
Sterling, Ill. (1) N15 ...5.675
Sterling, Ill. N15 .....5.775
Struthers, O. Y1 .....5.675
Tonawanda, N.Y. B12 ..6.10
Torrance, Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown, Pa. B2 .....7.33
Kansas City, Mo. S5 ....7.60
Lackawanna, N.Y. B2 ..7.35
Marion, O. P11 .....6.70
Newark, N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Sand Springs, Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
Sparrows Pt., Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport, Pa. S19 ..7.25

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 15.10
Economy, Pa. (D.R.) B14 19.30
Econ. (Direct Rolled) B14 13.55
Economy (Staybolt) B14 19.80
McK. Rks. (S.R.) L5 ..14.50
McK. Rks. (D.R.) L5 ...19.80
McK. Rks. (Staybolt) L5. 20.95

BARS, Rail Steel

Chicago Hts. (3) C2, I-2 5.575
Chicago Hts. (4) (44) I-2 5.675
Chicago Hts. (4) C2 ....5.675
Franklin, Pa. (3) F5 ..5.575
Franklin, Pa. (4) F5 ..5.675
Jersey Shore, Pa. (3) J8 ..5.55
Marion, O. (3) P11 .....5.575
Tonawanda (3) B12 ...5.575
Tonawanda (4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Alabama City, Ala. R2 ..5.10
Allenport, Pa. P7 .....5.10
Aliquippa, Pa. J5 .....5.10
Ashland, Ky. (8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Fairless, Pa. U5 .....5.15
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Geneva, Utah C11 .....5.20
Granite City, Ill. (8) G4 ..5.20
Ind. Harbor, Ind. I-2, Y1 5.10
Irvin, Pa. U5 .....5.10
Lackawanna, N.Y. B2 ..5.10
Mansfield, O. E6 .....5.10
Munhall, Pa. U5 .....5.10
Newport, Ky. A2 .....5.10
Niles, O. M21, S3 .....5.10
Pittsburg, Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth, O. P12 ....5.10
Riverdale, Ill. A1 .....5.10
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. U5, W14 ..5.10
Sparrows Point, Md. B2 ..5.10
Steubenville, O. W10 ....5.10
Warren, O. R2 .....5.10
Weirton, W. Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles, O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary, Ind. U5 .....8.40
Ind. Harbor, Ind. Y1 ....8.40
Irvin, Pa. U5 .....8.40
Munhall, Pa. U5 .....8.40
Newport, Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....7.525
Ashland, Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.525
Fairfield, Ala. T2 .....7.525
Fairless, Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana, Calif. K1 .....8.25
Gary, Ind. U5 .....7.525
Ind. Harbor, Ind. I-2, Y1 7.525
Irvin, Pa. U5 .....7.525
Lackawanna (35) B2 ..7.525
Munhall, Pa. U5 .....7.525
Niles, O. S3 .....7.525
Pittsburgh J5 .....7.525
S. Chicago, Ill. U5, W14 7.525
Sharon, Pa. S3 .....7.525
Sparrows Point (36) B2 ..7.525
Warren, O. R2 .....7.525
Weirton, W. Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10 ....5.35
Cleveland R2 .....5.875
Warren, O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown, O. A10 ....6.775
Warren, O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Alabama City, Ala. R2 ..6.275
Aliquippa, Pa. J5 .....6.275
Allenport, Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken, Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse, Mich. G5 .....6.275
Fairfield, Ala. T2 .....6.275
Fairless, Pa. U5 .....6.325
Follansbee, W. Va. F4 ..6.275
Fontana, Calif. K1 .....7.40
Gary, Ind. U5 .....6.275
Granite City, Ill. G4 ....6.375
Ind. Harbor, Ind. I-2, Y1 6.275
Irvin, Pa. U5 .....6.275
Lackawanna, N.Y. B2 ..6.275
Mansfield, O. E6 .....6.275
Middletown, O. A10 ....6.275
Newport, Ky. A2 .....6.275
Pittsburg, Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth, O. P12 ....6.275
Sparrows Point, Md. B2. .6.275
Steubenville, O. W10 ...6.275
Warren, O. R2 .....6.275
Weirton, W. Va. W6 ...6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse, Mich. G5 .....9.275
Fairless, Pa. U5 .....9.325
Fontana, Calif. K1 ....10.40
Gary, Ind. U5 .....9.275
Ind. Harbor, Ind. I-2, Y1 9.275
Lackawanna (38) B2 ..9.275
Pittsburgh J5 .....9.275
Sparrows Point (33) B2. .9.275
Warren, O. R2 .....9.275
Weirton, W. Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala. City, Ala. R2	7.225	....
Ashland, Ky. A10	7.225	7.475
Canton, O. R2	7.225	....
Fairfield, Ala. T2	7.225	7.475
Gary, Ind. U5	7.225	7.475
Granite City, Ill. G4	7.325	....
Ind. Harbor I-2	7.225	7.475
Irvin, Pa. U5	7.225	7.475
Kokomo, Ind. C16	7.325	....
Martins Fry. W10	7.225	7.475
Pitts., Calif. C11	7.975	....
Pittsburgh J5	7.225	....
Sparrows Pt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind. Harbor, Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

Alabama City, Ala. R2. .6.875‡
Ashland, Ky. A10 ....6.875‡
Canton, O. R2 .....6.875‡
Dover, O. E6 .....6.875†
Fairfield, Ala. T2 .....6.875†
Gary, Ind. U5 .....6.875†
Granite City, Ill. G4 ..6.975*
Ind. Harbor, Ind. I-2 ..6.875†
Irvin, Pa. U5 .....6.875†
Kokomo, Ind. C16 ....6.975‡
Martins Fry. O. W10. .6.875*
Middletown, O. A10 ..6.875†
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
Sparrows Pt., Md. B2 ..6.875†
Warren, O. R2 .....6.875†
Weirton, W. Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin, Pa. U5 .....10.125
Pittsburgh J5 .....10.125
Sparrows Pt. (39) B2. .10.025

SHEETS, Galvannealed Steel

Canton, O. R2 .....7.275
Irvin, Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland, Ky. A10 .....7.125
Middletown, O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland (28) R2 .....7.65
Niles, O. (28) R2 .....7.65'
Weirton, W. Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana, Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 9.525
Butler, Pa. A10 (type 2) 9.625
Irvin, Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland, Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield, Ala. T2 .....6.775
Gary, Ind. U5 .....6.775
Ind. Harbor, Ind. I-2, Y1 6.775
Irvin, Pa. U5 .....6.775
Middletown, O. A10 ....6.775
Niles, O. M21, S3 .....6.775
Sparrows Point, Md. B2. .6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover, O. E6 .....8.70
Ind. Harbor, Ind. I-2 ....8.70
Mansfield, O. E6 .....8.70
Warren, O. R2 .....8.70
Yorkville, O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

Beech Bottom, W. Va. W10 7.225
Gary, Ind. U5 .....7.225
Mansfield, O. E6 .....7.225
Middletown, O. A10 ....7.225
Niles, O. M21, S3 .....7.225
Warren, O. R2 .....7.225
Weirton, W. Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman & Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S. & W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W. Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 .8.325
SparrowsPoint,Md. B2 ..7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ....7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M22.7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 ....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ..15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.3°C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, Hot-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M22 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harbor Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.30
Fairless,Pa. U5 .....8.30
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 .....8.30
Ind.Harbor,Ind. I-2, Y1 8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg Calif. C11 ....8.85
SparrowsPoint,Md. B2..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 .....7.95
Ind.Harbor Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$10.05
Irvin,Pa. U5 .....10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed 1½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*11.30*		12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*11.20*		11.90*	13.05*	....
Mansfield,O. E6	9.875*11.70		12.40	13.55	14.65
Newport,Ky. A2	9.875 11.70*		12.40*	13.55*	14.65*
Niles,O. M21	9.875*11.70		12.40	13.55	....
Vandergrift,Pa. U5	9.875*11.70		12.40	13.55	14.65
Warren,O. R2	9.875*11.70		12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed 1½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ..8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 .8.10
Sterling,Ill. (1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....13.40
KansasCity,Mo. U3 ...12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling, N.J. R5 ....12.95
SparrowsPt.,Md. B2 ..13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 ....12.65
Worcester,Mass. A7 ..12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown Pa. B2 .....9.75
KansasCity,Mo. 85, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W12 ...10.05
Pittsburg,Calif. C11 ..10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ..10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Millbury,Mass.(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity Mo. S5 ....16.55
Kokomo,Ind. C16 ....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 ....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 .....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	....17.15
Roebling,N.J. R5	....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....12.35
Baltimore T6	.....12.65
Boston T6	.....12.65
Buffalo W12	.....12.35
Chicago W13	.....12.45
Cleveland A7	.....12.35
Crawfordsville,Ind. M8	.12.35
Dover,O. G6	.....12.35
Farrell,Pa. S3	.....12.35
Fostoria,O. S1	.....12.35
FranklinPark,Ill. T6	..12.45
Kokomo,Ind. C16	.....12.35
Massillon,O. R8	.....12.35
Milwaukee C23	.....12.55
Monessen,Pa. P7, P16	..12.35
Palmer,Mass. W12	.....12.65
Pawtucket,R.I. N8	.....12.65
Philadelphia P24	.....12.65
Riverdale,Ill. A1	.....12.45
Rome,N.Y. R6	.....12.35
Sharon,Pa. S3	.....12.35
Trenton,N.J. R5	.....12.65
Warren,O. B9	.....12.35
Worcester,Mass. A7,T6	.12.65

NAILS, Stock Sizes Col.

AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	...$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	..$10.10

POLISHED STAPLES Col.

AlabamaCity,Ala. R2	..175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville Ill. K4	175
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	.$8.78
Atlanta A11	.....10.36
Bartonville,Ill. K4	.....8.88
Buffalo W12	.....10.26
Chicago W13	.....9.24
Crawfordsville,Ind. M8	..8.88
Donora,Pa. A7	.....8.78
Duluth A7	.....8.78
Fairfield,Ala. T2	.....8.78
Houston S5	.....10.51
Jacksonville,Fla. M8	..8.88
Johnstown,Pa. B2	.....8.78
Joliet,Ill. A7	.....8.78
KansasCity,Mo. S5	....10.51
Kokomo,Ind. C16	.....8.88
LosAngeles B3	.....9.44
Minnequa,Colo. C10	....9.49
Pittsburg,Calif. C11	....9.44
S.Chicago,Ill. R2	.....8.78
S.SanFrancisco C10	....9.94
SparrowsPt.,Md. B2	....8.88
Sterling,Ill.(37) N15	....8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	..$9.06
Atlanta A11	.....10.70
Bartonville Ill. K4	.....9.16
Buffalo W12	.....10.60
Chicago W13	.....9.54
Crawfordsville,Ind. M8	..9.16
Donora,Pa. A7	.....9.06
Duluth A7	.....9.06
Fairfield,Ala. T2	.....9.06
Houston S5	.....10.85
Jacksonville,Fla. M8	...9.16
Johnstown,Pa. B2	.....9.06
Joliet,Ill. A7	.....9.06
KansasCity,Mo. S5	....10.85
Kokomo,Ind. C16	.....9.16
LosAngeles B3	.....9.75
Minnequa,Colo. C10	....9.79
Pittsburg,Calif. C11	....9.75
S.Chicago,Ill. R2	.....9.06
S.SanFrancisco C10	...10.26
SparrowsPt.,Md. B2	...9.16
Sterling,Ill.(37) N15	...9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	.$9.11
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....9.21
Buffalo W12	.....10.65
Chicago W13	.....9.59
Crawfordsville,Ind. M8	..9.21
Donora,Pa. A7	.....9.11
Duluth A7	.....9.11
Fairfield,Ala. T2	.....9.11
Houston S5	.....10.90
Jacksonville,Fla. M8	...9.21
Johnstown,Pa. B2	.....9.11
Joliet,Ill. A7	.....9.11
KansasCity,Mo. S5	....10.96
Kokomo,Ind. C16	.....9.21
LosAngeles B3	.....9.80
Minnequa,Colo. C10	....9.84
Pittsburg,Calif. C11	....9.80
S.Chicago,Ill. R2	.....9.11
S.SanFrancisco C10	...10.31
SparrowsPt.,Md. B2	....9.21
Sterling,Ill.(37) N15	...9.21

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	...212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS Col.

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	..177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	...177

WIRE, Barbed Col.

AlabamaCity,Ala. R2	.193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....198§
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	....198**
Monessen Pa. P7	.....196§
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
S.SanFrancisco C10	....213*
SparrowsPoint,Md. B2	.198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.....187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	.....192§
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo Ind. C16	.....189†
Minnequa,Colo. C10	....192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A7	.....187†
S.Chicago,Ill. R2	....187**
Sterling,Ill.(7) N15	192

WIRE (16 gage) An'ld Galv. Stone Stone

Ala.City,Ala.R2	17.85 19.40**
Aliq'ppa,Pa. J5	..17.85 19.65
Bartonville K4	..17.95 19.80
Cleveland A7	....17.85 ....
Craw'dville M8	17.95 19.80‡‡
Fostoria,O. S1	..18.35 19.90†
Houston S5	....18.10 19.65**
Jacksonville M8	18.95 19.80‡‡
Johnstown B2	..17.85 19.65§
Kan.City,Mo. S5	..18.10 ....
Kokomo C16	....17.95 19.50†
Minnequa C10	..18.10 19.65**
P'lm'r,Mass.W12	18.15 19.70†
Pitts.,Calif. C11	18.20 19.75†
S.SanFran. C10	18.20 19.75**
St'ling(37) N15	..17.95 19.80
SparrowsPt. B2	..17.95 19.75§
Waukegan A7	..17.85 19.40†
Worcester A7	...18.15 ....

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala. R2	..9.00 9.55**
Aliquippa J5	....8.65 9.325§
Atlanta(48) A11	..9.10 9.775§
Bartonville(48) K4	9.85 19.90
Buffalo W12	....9.00 9.55†
Cleveland A7	....9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	...9.00 9.55†
Duluth A7	...9.00 9.55†
Fairfie'd T2	...9.00 9.55†
Houston(48) S5	..9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	....9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	..9.10 9.65†
LosAngeles B3	..9.95 10.625§
Minnequa C10	...9.25 9.80**
Monessen(48) P7	..8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	..9.95 10.50†
Rankin,Pa. A7	...9.00 9.55†
S.Chicago R2	....9.00 9.55**
S.SanFran. C10	.9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	.9.10 9.80
Struthers,O. Y1	...9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less **Subject to zinc equalization than 10c. ††10.50c. ‡‡11.00c. tion extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Plated:	Zinc
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Plated:	Zinc
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Plated:	Zinc
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:

Packages	+ 5
Bulk	+19

Through 1 in. diam., longer than 6 in.:

Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	.....6.875
Gary,Ind. U5	.....6.875
Lackawanna,N.Y. B2	..6.875
Minnequa,Colo. C10	...6.875
Seattle B3	.....7.025
Steelton,Pa. B2	.....6.875
Torrance,Calif. C11	...7.025

JOINT BARS

Bessemer,Pa. U5	.....7.25
Fairfield,Ala. T2	.....7.25
Joliet,Ill. U5	.....7.25
Lackawanna,N.Y. B2	..7.25
Minnequa,Colo. C10	....7.25
Steelton,Pa. B2	.....7.25

AXLES

Ind.Harbor,Ind. S13	...9.125
Johnstown,Pa. B2	....9.125

SCREW SPIKES

Lebanon,Pa. B2	.....15.10

TRACK BOLTS, Untreated

Cleveland R2	.....15.35
KansasCity,Mo. S5	....15.35
Lebanon,Pa. B2	.....15.35
Minnequa,Colo. C10	...15.35
Pittsburgh S44	.....15.35
Seattle B3	.....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	....10.10
Lebanon,Pa. B2	.....10.10
Minnequa,Colo. C10	...10.10
Pittsburgh J5	.....10.10
Seattle B3	.....10.60
S.Chicago,Ill. R2	.....10.10
Struthers,O. Y1	.....10.10
Youngstown R2	.....10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.52		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.35	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk. (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B3, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 6000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except; Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	7.32	10.20	10.95	53.00	8.34	7.95	10.65	15.95	7.91	7.51	10.13
Cincinnati	8.91	10.26	11.00	53.43	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	7.32	9.88	11.14	52.33	8.46	8.06	11.25	16.06	8.30	7.75	10.37
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	57.60	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Memphis, Tenn.	9.84	10.05	....	....	11.24	9.92	12.74	....	10.33	10.12	11.41
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
Moline, Ill.	9.24	10.70	11.45	....	10.90	9.34	11.15	16.45	9.83	9.17	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	53.08	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	9.60	10.66	52.17	10.85	9.25	11.95	16.38	9.45	9.20	10.45
Pittsburgh	7.32	9.88	11.03	52.33	8.44	7.95	11.25	15.95	7.91	7.51	10.13
Portland, Oreg.	10.20	12.05	12.35	....	12.20	10.20	16.65	17.80	10.80	10.35	12.50
St. Louis	8.84	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.45	55.10	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.07	11.44	12.05	56.52	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash.	9.92	11.29	11.90	56.52	11.69	9.81	16.20	17.80	10.44	10.02	12.31

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumbar, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 72-75%, c.i.f. Atlantic ports	22.00
Brazilian 68.5%, f.o.b. vessell Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98%Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron:	
90-99.9%, 3 to 20 microns, depending on grade, $8.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	40.90
Bronze, filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver,	61.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90

Tungsten:	Dollars
Carbon reduced, 98.8% min., minus 65 mesh	nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.35	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	6.50	6.35	6.35	6.70
Bright Common Wire Nails (‡)	8.50	7.40	7.40	7.25	7.65

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton. Palmerton, Pa. 21-23% Mn, $102.50. 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractinos in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered, Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, St 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 3% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20 max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.2c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

C ELECTRIC FURNACE STEEL CASTINGS

are engineered to *YOUR* specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

CARBON, ALLOY OR STAINLESS STEEL SAND OR SHELL MOULDED

The technical experience and knowledge of our engineering staff are at your service. Write, phone, or call.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE 2, PENNA.

If METALWORKING PLANTS ARE YOUR PROSPECTS...

✔ **STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, O.**

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2303H North 11th St. • St. Louis 6, Mo.

HOT DIP GALVANIZING

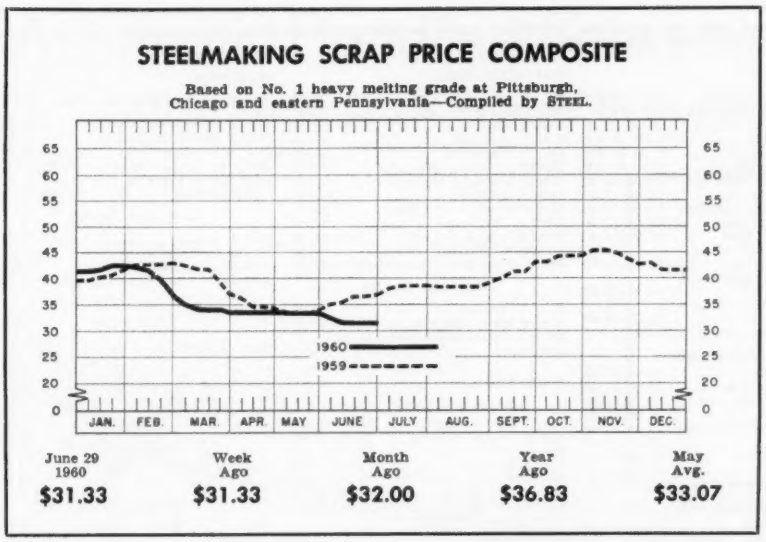
JOSEPH P. CATTIE & BROTHERS, INC.
2520 East Hagert Street
Phone: Re-9-8911 Philadelphia 25, Pa.

LOOKING FOR SURPLUS MACHINERY?

By checking the classified pages of STEEL each week you'll be able to find many different types of equipment which will fit your requirements. Used or surplus equipment—you can best find it in STEEL's classified columns.

ARE YOU OFFERING A SERVICE?

If your company performs plating, galvanizing, finishing or any one of dozens of metalworking operations on a contract basis, you can attract new customers by inserting an advertisement in the classified pages of STEEL.



Scrap Demand Sags with Steel Rate

Holiday-vacation slump in steelmaking puts market under pressure, but STEEL's composite on No. 1 heavy melting steel holds at $31.33 for fourth straight week

Scrap Prices, Page 110

• **Pittsburgh**—The local plant of GM's Fisher Body Div. sold its No. 1 factory bundles to brokers at $33.89, f.o.b. (vs. $34.75 last month). The price was about $1 higher than expected—possibly because bidders were speculating on a resurgence of demand and higher prices when steelmaking operations turn upward. Distress sales may drive prices of some grades below current quotations in the next few weeks, but most observers believe the market has hit bottom. Peddlers have stopped bringing scrap into the yards, and small dealers have stopped selling at low prices. If No. 2 bundles have bottomed out at $25—as trade sources believe—it's a good bet that No. 1 heavy melting won't fall below $30.

• **Philadelphia** — Prices are unchanged. Domestic demand continues spotty, and were it not for continued good buying on export account, prices would be easier. Sellers expect no early improvement in domestic buying.

• **New York**—Brokers have reduced their buying prices $1 a ton on No. 1 cupola cast to $36-$37 and heavy breakable to $30-$31. Also, they have dropped 18-8 sheets, clips, and solids $5 a ton for the third straight week, the latest reduction bringing the price to $165-$170.

• **Chicago**—Scrap prices are unchanged, but in the absence of buying they are largely nominal. The general tendency is toward further weakness in view of the sharp drop in steelmaking activity last week, and the still greater drop that will take place this week as the steel plants shut down for the holiday, and in some instances, for a longer than usual period.

Cleveland—The market is tending downward. Industrial lists are reported going at $1 to $1.50 a ton under prices done a month ago. Little interest is being shown by consumers with steel operations curtailed because of the holiday, vacations, and lack of new steel orders. Quoted prices are largely nominal in the absence of a buying test. Little change in the market is anticipated until next month.

• **Detroit**—Auto lists closing at the end of last week were indicated to have brought only slightly lower bids than at the end of May. That was because less tonnage was offered.

• **Buffalo** — With mill operations below 50 per cent of capacity here, the scrap trade expects only limited buying through July. Many foundries will be closed for vacations during the month. But prices are not expected to fall much lower—otherwise, dealers point out, scrap supplies will dry up quickly. Mills hold substantial inventories.

• **Cincinnati**—The market is at a standstill. With No. 1 heavy melting unchanged at $26.50-$27.50, no change is anticipated during July. Dealers think there may be a pick-up in demand in August.

• **St. Louis**—Prices are off $1 to $3 a ton, mainly reflecting slow business over the next few weeks. Steelmaking operations will be curtailed because of mass vacations.

• **Birmingham**—Old orders are being shipped, but new sales are lacking in this district. Plant shutdowns for vacations began June 27 and will continue into August. Brokers anticipate little buying this month. They have reduced some of their nominal prices another $1 a ton. Export demand is slow.

• **Seattle** — Domestic demand for scrap is slow, but the market is being supported by exports. Large domestic consumers hold big inventories. Exporters say Japanese buyers are interested in additional tonnage, and they are assembling cast iron tonnage for shipment this month. Japanese demand for heavy melting steel is off.

• **San Francisco** — Although the

(*Please turn to Page* 115)

FOR SALE
PRIME QUALITY OLIN ALUMINUM EMBOSSED UTILITY SHEETS

5000# .025 x 36 x 96
5300# .022 x 36 x 96
5200# .022 x 36 x 120
5500# .020 x 36 x 96
4900# .020 x 30 x 120
5200# .016 x 36 x 96

Stored inside in original Mill crates. Priced BELOW Mill.

SLIGO, INC. *Steel Division*
Box 171, St. Louis 66, Missouri

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, June 29, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 29	$31.33
June 22	31.33
May Avg.	33.07
June 1959	36.07
June 1955	35.44

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
No. 1 factory bundles	*35.00-36.000*
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	18.00-19.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	37.00-38.00
3 ft and under	36.00-37.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	39.00-40.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Stove plate	*35.00-36.00*
Unstripped motor blocks	*28.00-29.00*
Clean auto cast	*37.00-38.00*
Drop broken machinery	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 2 ft and under	51.00-52.00
Rails, 18 in. and under	52.00-53.00
Random rails	45.00-46.00
Angles, splice bars	45.00-46.00
Railroad specialties	46.00-47.00
Rails, rerolling	*51.00-52.00*

Stainless Steel Scrap

18-8 bundles & solids	200.00-205.00†
18-8 turnings	100.00-105.00†
430 bundles & solids	100.00-105.00†
430 turnings	50.00-55.00†

CHICAGO

No. 1 hvy melt., indus.	30.00-31.00
No. 1 hvy melt., dealer	28.00-29.00
No. 2 hvy melting	25.00-26.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	29.00-30.00
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	30.00-31.00
No. 1 busheling, dealer	28.00-29.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals, 3 ft	33.00-34.00
Punchings & plate scrap	35.00-36.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	*34.00-35.00*
Unstripped motor blocks	32.00-33.00
Clean auto cast	45.00-46.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	44.00-45.00
Rails, 2 ft and under	46.00-47.00
Rails, 18 in. and under	47.00-48.00
Angles, splice bars	40.00-41.00
Axles	49.00-50.00
Rails, rerolling	49.00-50.00

Stainless Steel Scrap

18-8 bundles, solids	*165.00-170.00*
18-8 turnings	*85.00-90.00*
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	14.00-15.00
No. 1 bundles	28.00-29.00
No. 2 bundles	12.50-13.50
No. 1 busheling	24.00-25.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00†
No. 2 heavy melting	23.00-24.00†
No. 1 factory bundles	*32.00-33.00*
No. 1 bundles	31.00-32.00†
No. 2 bundles	17.00-18.00†
No. 1 busheling	31.00-32.00†
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00†

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random length	44.00-45.00
Cast steel	38.00-39.00
No. 1 railroad cast	46.00-47.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	54.00-55.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*175.00-180.00*
18-8 turnings	*75.00-80.00*
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00†
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	33.00-34.00†
No. 1 bundles	33.00-34.00†
No. 2 bundles	20.00-21.00†
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	22.00-23.00
No. 1 busheling	30.00-31.00
Shovel turnings	19.00-20.00
Machine shop turnings	14.00-15.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	50.00-51.00
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	17.50-18.50
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos. 18 in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Heavy breakable cast	32.00-33.00
Charging box cast	36.00-37.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	45.00-46.00

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	36.00
No. 2 bundles	20.00
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00†
Machine shop turnings	15.00
Heavy turnings	28.00
Structurals & plates	38.00-40.00
Couplers, springs, wheels	40.00
Rail crop, 2 ft & under	56.00-57.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	40.00
Drop broken machinery	51.00-52.00
Malleable	51.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Unstripped motor blocks	25.00-26.00
Heavy breakable	*30.00-31.00*

Stainless Steel

18-8 sheets, clips solids	*165.00-170.00*
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-25.50
No. 2 heavy melting	22.00-23.00
No. 1 bundles	25.00-25.50
No. 1 busheling	25.00-25.50
Machine shop turnings	6.00-7.00
Shovel turnings	9.00-10.00
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	28.00-29.00
No. 2 bundles	*16.00-17.00*
No. 1 busheling	31.00-32.00
Cast iron borings	*9.00-10.00*
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	*36.00-37.00*
Structurals & plate	*35.00-36.00*
Electric furnace bundles	32.00-33.00
Electric furnace:	
3 ft and under	*31.00-32.00*
2 ft and under	33.00-34.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Stove plate	*46.00-47.00*
Unstripped motor blocks	*36.00-37.00*
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Angles, splice bars	39.00-40.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	*9.00†*
Shovel turnings	*11.00†*

Cast Iron Grades

No. 1 cupola	*44.00†*
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	35.00†
Clean auto cast	*45.00†*
Stove plate	*36.00†*

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00†*
Rails, random lengths	*38.00†*
Rails, rerolling	50.00†
Rails, 18 in. and under	*41.00†*
Angles, splice bars	41.00†

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	*12.00-12.50*
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	*34.00-35.00*
Heavy breakable	27.00†
Foundry malleable	31.00†
Unstripped motor blocks	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	37.00
No. 2 heavy melting	34.00
No. 1 bundles	35.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Shovel turnings	18.00
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	42.00

Cast Iron Grades

No. 1 cupola	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-34.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00-38.00
No. 2 heavy melting	32.00-35.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	30.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	34.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy. melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

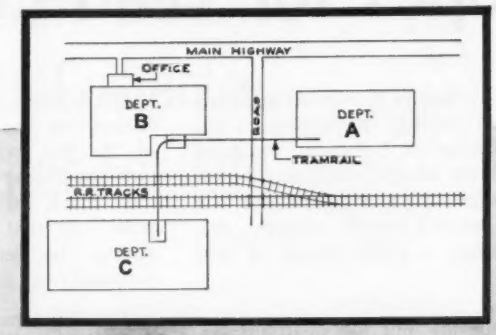
Cast Iron Grades‡

No. 1 machinery cast	43.00

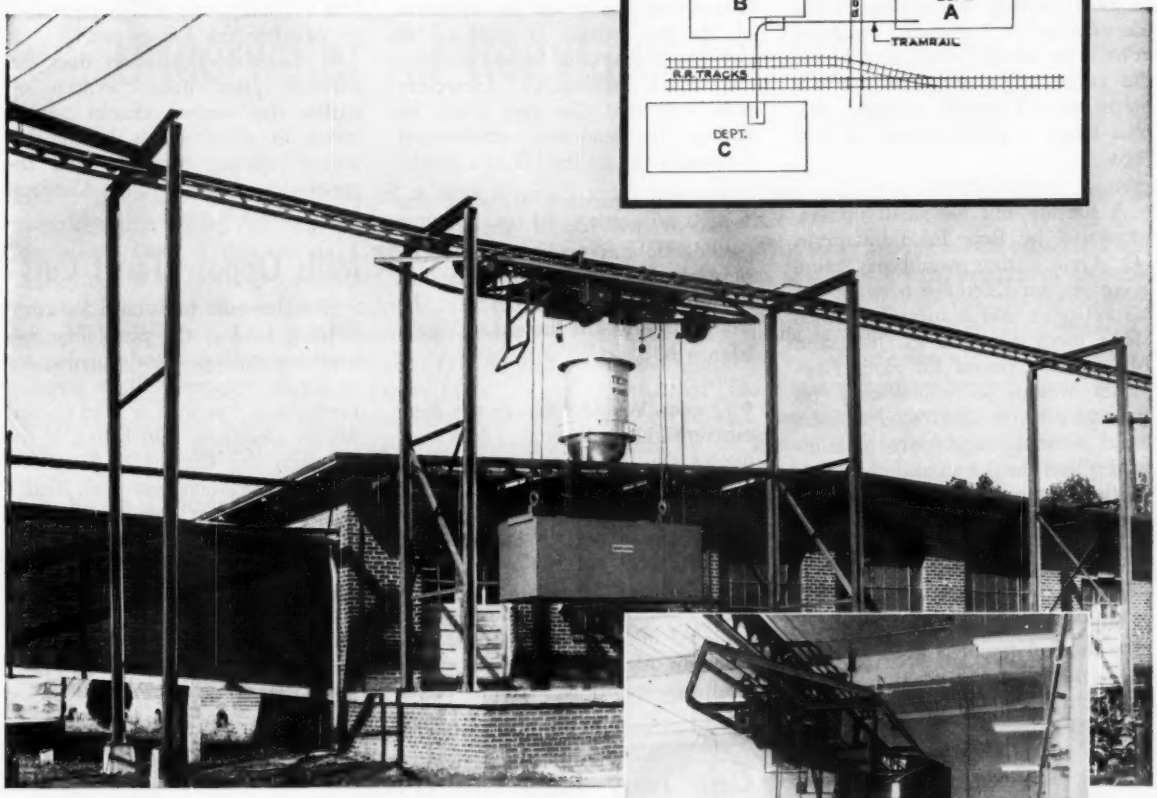
†Nominal.
‡F.o.b. Hamilton, Ont.

Automatic Handling Between Three Buildings

Operation Costs Plunge Because of Time Saved



Photograph shows van being lowered to outside dock. It remains here until unloaded or loaded and dispatched.

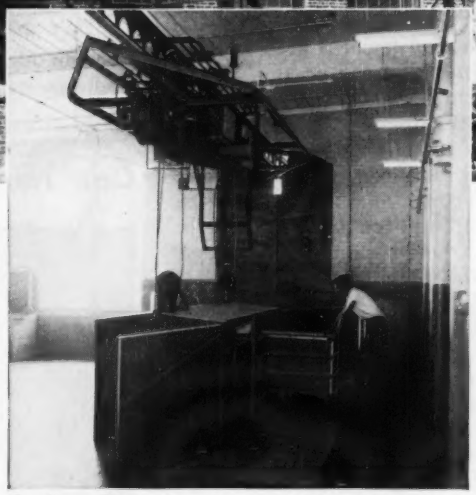


AN automatic Cleveland Tramrail materials handling system operates over a street and railroad to serve three separate buildings. It carries materials back and forth between the plants without need of especially assigned operators. The dispatching of materials is easily handled by men in the buildings along with their other work, since it is only necessary to press a push button to send a Tramrail carrier on its way.

The Tramrail carrier travels up and down grades because the buildings are at different elevations. When it reaches its destination, it lowers at once, automatically. A warning bell sounds as it descends.

Because of the time savings and elimination of need of many powered floor trucks and their expensive maintenance, cost of handling materials between the buildings is very low.

Cleveland Tramrail has engineered a wide variety of automatic materials handling systems. We stand ready to share with you the benefit of our experience.



Loading a Tramrail carrier van with four floor trucks. Each has a load of 250 lbs. Depressing the proper button on the wall sends the van to either of the other two buildings.

Write for free "Automatic Handling" booklet.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7836 E. 290 ST. • WICKLIFFE, OHIO

Hopes for Lead-Zinc Aid Revived

AFTER years of frustrated attempts to push through legislation to aid the domestic lead-zinc industry, mine state congressmen may be on the verge of victory. In the last hours before Congress adjourns, two bills stand a good chance of passage.

• A subsidy bill for small miners, sponsored by Rep. Ed Edmondson (D., Okla.), that would pay mine operators the difference between the market price and a subsidized price of 17 cents a pound for lead and 14.5 cents a pound for zinc. Payments would be made only on quantities up to 2000 tons of each metal annually and only to companies that do not exceed that production figure. Cost of the program is pegged at $5 million annually.

• A bill sponsored by Sen. Robert S. Kerr (D., Okla.), calling for a hike in lead import duties for ores and concentrates from the present 0.75 cent a pound to 1.4 cents and for metal from the present 1.0625 cents a pound to 2 cents. For zinc, the tax on ores and concentrates would climb from the current 0.6 cent a pound to 1.05 cents and for metal from 0.7 cent to 1.5 cents a pound. In addition, a flexible lead duty of 0.7 cent on ores and concentrates and 1 cent on metal would go into effect when the average market price drops below 13.5 cents a pound. It would apply until the average price rises to 14.5 cents. The same flexible duties would apply when the zinc price falls to 12.5 cents and would remain in effect until the price rises to 13.5 cents.

• **Where They Stand**—As STEEL went to press, the Edmondson Bill for small producers had passed the House and was expected to get early Senate approval. Odds seem good the President will give the bill his blessing.

The Kerr lead-zinc measure is a rider on a revenue bill for the Virgin Islands. The Senate Finance Committee has given its approval of the bill, which is expected to pass the House and Senate without too much difficulty. Observers point out that Congress won't be voting the lead-zinc amendment separately but on the bill as a whole.

The big question is what the President will do if the bill is passed. He has made no secret he is opposed to lead-zinc tariffs, but to veto the lead-zinc proposal, he would have to kill the entire Virgin Islands bill.

• **Quotas Would Die**—If the Kerr measure gets through, look for quotas on the two metals to be dropped right away. Also, don't expect too much jubilation among lead-zinc producers. While the Kerr Bill will be preferable to quotas among industry people, it will completely satisfy no one. Many of the domestic miners don't think it provides for high enough tariffs. Most smelters, naturally, would prefer neither tariffs nor quotas. Prices will probably stay stable regardless of whether the bill passes.

If lead-zinc legislation does get through after being written off earlier this session, thanks can be given to some adroit behind-the-scenes juggling of favors and the generosity that pervades Congress in an election year.

Mills Oppose Tariff Cuts

The domestic brass mill industry, fighting mad at the possibility that what it considers already inadequate tariffs on imports will be lowered even more, has filed a brief outlining its objections. On behalf of the industry, the Copper & Brass Research Association last week filed a statement before the Tariff Commission and the Commission for Reciprocity Information opposing the possible reduction of tariff or excise taxes on certain brass mill products listed for possible concessions in forthcoming trade agree-

(*Please turn to Page* 115)

Can They Turn the Trick?

Oklahoma Democrats, Sen. Robert S. Kerr (left) and Rep. Ed Edmondson, have given lead-zinc legislation a last minute shot in the arm

HANDY & HARMAN SILVER BRAZING
Permits Manufacturer to Guarantee Underwater Air Regulator For Life

Perhaps the most vital component of a skin diver's equipment, this Viking Air Regulator, manufactured by Christensen Tool & Engineering Company, Norwalk, Connecticut, is structurally guaranteed for life. It must, under all conditions, be absolutely leaktight. The manufacturer's guarantee is a relatively recent achievement—through the high-strength help of silver alloy brazing with Handy & Harman EASY-FLO 45 and HANDY FLUX.

Over and above the unreserved dependability of brazed joints, the brazing method itself has saved the company considerable time, money and material in the production of the Viking Air Regulator. Brazing's simplicity is interestingly illustrated in this case by this company's requirement that assemblers and testers of the Viking must be skin divers themselves.

Almost invariably, silver brazing effects economies and brings advantages to whatever part, product or assembly it is applied. True, air regulators are few and far between, but the point is that they are *metal products, made of a number of different metal components.*

And that's the phrase that covers brazing's great adaptability. To give you a good idea of how you can put brazing to work, we'd like to send you Bulletin 20—it covers the basics of brazing and it may very easily solve your metal-joining problems. Handy & Harman, 82 Fulton Street, New York 38, N. Y.

Here, in "serial" form is how the guarantee is "brazed" into the Viking:

1. TANK HOUSING—Initially, this component was mechanically joined and made "airtight" by means of sealants. Now, brazing eliminates 8 holes, 4 tapping operations, 4 screws and 3 assembly operations.

5. Shown here are the finished Viking components before and after assembling. —Brazing by Specialty Brazing Laboratories, Riverside, Connecticut.

3. YOKE—This is assembled from stampings instead of castings, which were previously used. With brazing, no secondary finishing operations are required. Further, the part is stronger and lighter, and savings on material and labor on this component alone add up to 28%.

2. FORK ASSEMBLY—There are five separate brazed joints, done with hand torch and hand-fed wire. Brazing eliminates one tapped hole, a lock washer and a spacer, plus the fact that positive alignment is now guaranteed.

4. PISTON—This is the most important single element of the Viking. It regulates flow of oxygen from cylinder to mouthpiece; from 300 lbs. pressure to normal breathing. Without brazing, this part could not be made.

Your No. 1 Source of Supply and Authority on Brazing Alloys

HH

HANDY & HARMAN

General Offices: 82 Fulton St., New York 38, N. Y.

DISTRIBUTORS IN PRINCIPAL CITIES

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intristic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l, 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, and prompt, 101.875.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.35-4.50.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-25.00; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-25.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l, 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam.	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.00-2.25.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.00; light copper, 21.75; refinery brass (60% copper) dry copper content, 22.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.00; light copper, 21.75; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.50; yellow brass turnings, 14.00; radiators, 16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 112)

ment negotiations under GATT.

"In whole or in part, all the seven major lines of products made by domestic brass mills (except one) are included in the list of products that may be considered for tariff concessions, says T. E. Veltfort, managing director of CABRA. "Two of these products alone, brass and bronze sheets, plus rods and wire, represent over 50 per cent of the 1959 shipments of the entire domestic industry," he adds. Last year imports totaled over 199 million lb, or 10 per cent of the domestic market.

Nonferrous Notes

• Primary aluminum production took another step toward an all-time record year in May. Output totaled a whopping 175,863 tons, close to the record of 179,194 tons set last July. Through May, production for the year totaled 835,997 tons compared with 775,076 tons in the same period of 1959, reports the Aluminum Association.

• Foreign users took more copper in May, probably as a hedge against possible interrupted production in Africa. U. S. buying eased off. Deliveries to fabricators outside the U. S. stood at 210,868 tons and to U. S. fabricators 108,266 tons, a Free World total of 319,134 tons. This is almost identical with the April figure of 319,037 tons.

Scrap . . .

(*Concluded from Page* 109)

mills aren't buying, scrap prices are holding. They're being supported by export demand to some extent.

• **Los Angeles**—The market continues weak, with domestic demand lagging. But scrap continues to flow steadily to Japan. Supplies are abundant.

CLASSIFIED ADVERTISING

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AT SPECIAL PRICES

New and Unused

DIESEL-ELECTRIC

All Sizes—25 to 50 Ton

PHONE OR WIRE COLLECT

INDUSTRIAL BROWNHOIST CORPORATION

BAY CITY, MICHIGAN

FOR SALE

DIRECT ARC MELTING FURNACES

COMPLETE INSTALLATIONS

LECTROMELT—SIZE "S" 1000 #/Hr. Rating Door Charge, 500 KVA Transformer 25,000 V Primary, Controls, Switchgear and Spares.

LECTROMELT—SIZE "U" 250 #/Hr. Rating Door Charge, 300 KVA Transformer 25,000 V Primary, Controls, Switchgear and Spares.

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Penton Bldg. Cleveland 13, Ohio

IF YOU OPERATE A FURNACE . . . . .

We will purchase your scrap linings, retorts, conveyors, muffles, racks, etc. Any item made of Nickel alloy.

Write, Wire or Call

Weinstein Co.

610 W. 8th St.
Jamestown, N. Y.
Phone 61-154

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Let STEEL's classified columns do the job for you. STEEL reaches all types of executives in the metalworking industry. Plan now to reach the highly-trained men you want by means of an advertisement in the "classifieds." For rates, write STEEL, Penton Building, Cleveland 13, Ohio.

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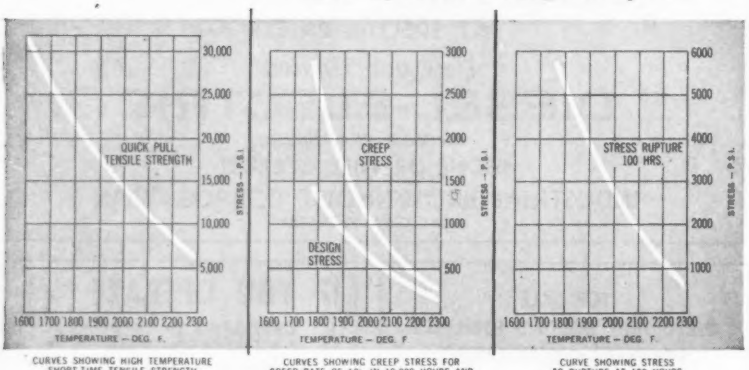
for strong high alloy requirements in the 1,800° to 2,300° F range!

DURALOY HOM*

*Covered by U.S. Patents

casting alloy

Duraloy "HOM" is a special high nickel alloy developed to produce castings that meet high temperature requirements, especially when castings are subject to oxidizing atmospheres.



CURVES SHOWING HIGH TEMPERATURE SHORT-TIME TENSILE STRENGTH OF DURALOY-HOM

CURVES SHOWING CREEP STRESS FOR CREEP RATE OF 1% IN 10,000 HOURS AND RECOMMENDED DESIGN STRESS FOR DURALOY-HOM

CURVE SHOWING STRESS TO RUPTURE AT 100 HOURS FOR DURALOY-HOM

Castings of DURALOY "HOM" are now being produced by our three methods: static, centrifugal and shell molded. Write today for additional information on this versatile new alloy.

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EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Ave., Pleasant Ridge, Mich.

Scrap Stocks Drop Less Than 1 Per Cent in April

Consumption of ferrous scrap and pig iron by domestic consumers in April totaled 11,482,000 gross tons (5,627,000 tons of scrap and 5,855,000 tons of pig iron), reports the U. S. Bureau of Mines.

The April metallics charge in furnaces (excluding iron ore and agglomerates) was 49 per cent scrap and 51 per cent pig iron.

Home scrap produced accounted for 3,435,000 gross tons during April, 12 per cent less than in March. Purchased scrap received by consumers in the month amounted to 2,184,000 tons, 13 per cent less than in the preceding month. Of the purchased scrap, 83 per cent came from dealers.

Ferrous scrap stocks held by consumers on Apr. 30 amounted to 8,277,000 gross tons, a drop of less than 1 per cent from the end of March. Stocks of pig iron, totaling 2,920,000 tons, were 7 per cent larger.

Europe Gets Six Cargoes Of Scrap from Detroit

European mills are buying more U. S. scrap. They like it because it's less contaminated than European material. Six boatloads, estimated at 30,000 tons, have left Detroit for Amsterdam and other European ports.

A major broker reportedly made the sale on an order placed earlier in the year when scrap was higher. It left Detroit at $37, and will be laid down in Amsterdam for $49, it's said. Actually the profit isn't as large as it seems. The order was placed earlier this year, the bundles probably costing $31 being sold at $32.25. To that $1.25 is added for in-transit cost, $3.50 for ship loading, and $12 for freight costs to the Netherlands. Additional tonnage may be added to the order at East Coast ports.

On that basis, the broker realized only a normal profit. The loss of interest for keeping his money tied up in loading and shipping charges could reduce his net return to 1 or 2 per cent on investment. As one dealer put it: "Even government bonds are a better buy."

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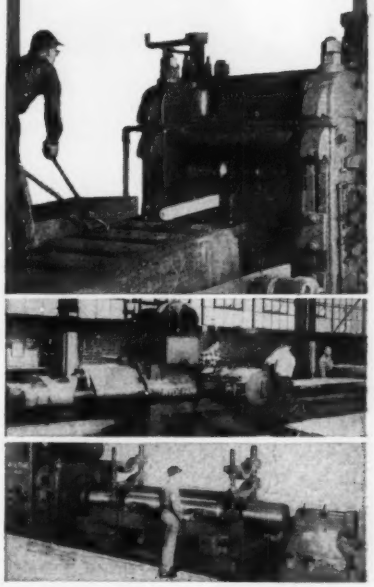
ROLLING MILL EQUIPMENT



Hyde Park Engineers are always ready to co-operate with you in selecting and applying the rolling mill equipment best suited to your operation.

Bar Mills • Merchant Mills
Sheet and Strip Mills
Stretcher Levellers
Roller Tables • Pinion Stands
Sheet Mill Shears
Roll Lathes • Reduction Drives
Special Machinery • Machine Work

Hyde Park
FOUNDRY AND MACHINE CO.
HYDE PARK
Westmoreland County, Penna.

Rolls
Rolling Mill Equipment
Gray Iron Castings

Greater visibility, trimmer lines for the new CHEVROLET, thanks to GAS! This is Libbey-Owens-Ford, where the new panoramic windshields are made for your beautiful new Chevrolet.

The forming of the curved glass is done in a limited temperature range at which glass can be bent without distortion. The production process challenged heat process engineers to design new automatic equipment capable of mass producing these large precision glass pieces.

LOF engineers, working with General Motors, discovered that Gas could produce the proper time-temperature cycle demanded by this process...efficiently, quickly, reliably.

The flat glass is conveyed under radiant Gas burners which bring the glass quickly up to bending temperature and allow the shaping of windshields, with reproducible uniformity, at high production rates.

The production of the Vista Panoramic windshield is another example of the contributions modern Gas equipment is making to American manufacturing. If your operation includes precise process heating, call your Gas company's industrial specialist and see how you can improve production with modern Gas equipment. **AMERICAN GAS ASSOCIATION**

FOR PROCESS HEATING GAS IS GOOD BUSINESS

AIR-CUSHIONED

vibration

Finishes parts up to 100 times faster!

New Pangborn Air-Cushioned Vibratory Finishing Machine—culmination of Pangborn's years of experimentation and refinements*—gives tremendous savings in finishing costs!

This is the 6 cu. ft. capacity Pangborn Air-Cushioned Vibratory Finishing Machine . . . perfect solution for cleaning, descaling, deburring, grinding, radiusing, fine-finishing, coloring or burnishing all metal and metal alloy parts, many suitable plastic and ceramic items.

- Works up to 100 times faster than conventional methods at lower cost.
- Most compact vibratory machine on the market.
- Air cushion suspension gives automatic leveling and amplitude control, supplants spring suspension systems subject to fatigue.
- Does work impossible to do by barrel finishing or other means.
- Standard basic machines are equipped with mechanically variable speeds.
- Floor vibration entirely eliminated, making possible (for the first time) second floor mounting.

Available in a wide range of sizes. Also auxiliary equipment, media and compounds for every need. Send parts with exact finish specifications, or finished specimen, for sample processing in our laboratory, to: Mr. William E. Brandt, PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md.

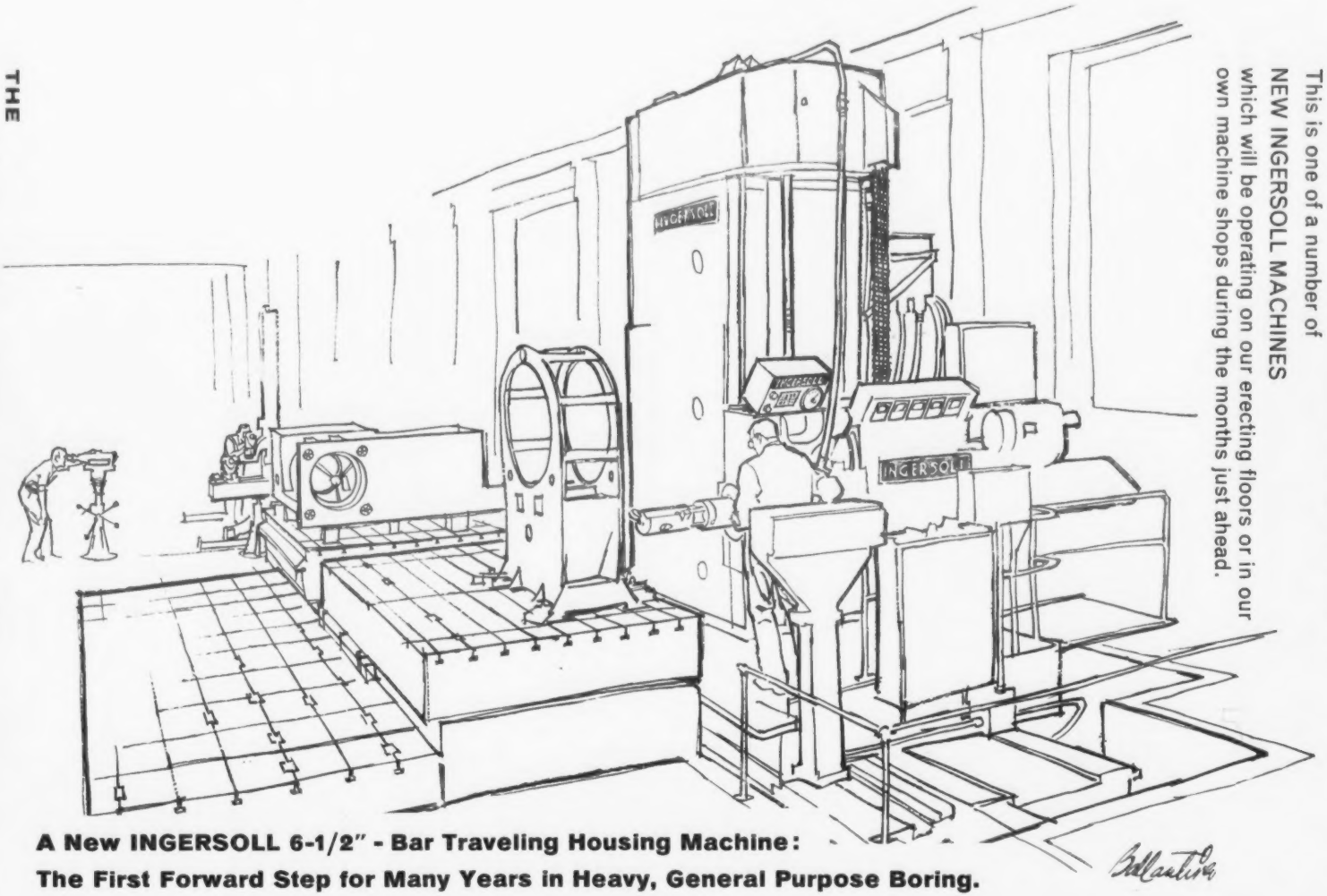
*Pat. No. 2,422,786; June 24, 1947

Pangborn

OF HAGERSTOWN

NEW AT INGERSOLL....

This is one of a number of
NEW INGERSOLL MACHINES
which will be operating on our erecting floors or in our own machine shops during the months just ahead.



A New INGERSOLL 6-1/2" - Bar Traveling Housing Machine:

The First Forward Step for Many Years in Heavy, General Purpose Boring.

The entire housing of this extremely precise stub boring machine feeds in and out to eliminate bar sag. All movements are measured by precision Ingersoll Read-Out Systems. Split work tables allow loading and inspection while boring. One table is stationary; the other indexes precisely for convenience in boring, as well as for optical inspection of the work before the piece is unclamped. The machine is rugged for heavy cuts and fast moving to the cut. The boring head is temperature-controlled, and the bar is clamped hydraulically to avoid distortion. The machine was designed to do all of our heavy general purpose boring.

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